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PESTICIDES ABSTRACTS (formerly Health Aspects of Pesticides Abstract Bulletin) is a monthly pulication of the Chemical Information Division of the Office of Pesticides and Toxic Substances, Environmental Protection Agency.

The purpose of this publication is to foster current awareness of the major worldwide literature pertaining to the effects of pesticides as defined in the Table of Contents. The publication represents a monthly review of more than 2,000 primary and secondary sources. A list of periodicals from which articles have been abstracted appears annually in the January issue. Subjects and authors of abstracted articles are cross-referenced in quarterly and annual indexes. Reprint requests should be directed to the author of the complete article.

Publication of an abstract, annotation, or citation does not imply endorsement by the Environmental Protection Agency of the original article or of commercial materials, equipment, or processes mentioned therin.

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80-0301. Yajima, T.; Munakata, K. (Lab. Pestic. Chem., Fac. Agric., Nagoya Univ., Nagoya, Japan) **Phloroglucinol-type furocoumarins, a group of potent naturally occurring insect antifeedants.** *Agric. Biol. Chem.* 43(8): 1701-1706; 1979 (18 references).

Naturally occurring phloroglucinol-type furocoumarins were found to have strong antifeeding activity against *Spodoptera litura* (tobacco cutworm), but the other furocoumarins belonging to pyrogallolor resorcinol-type had only weak activity. Antifeeding activity of these compounds against the other insects was also reported. Using these furocoumarins as alternatives to chemical insecticides is discussed. (Author abstract by permission)

80-0302. Goldschmidt, H. (Author address not given) **Green hair.** *Arch. Dermatol.* 115(11): 1288; 1979 (5 references).

The phenomenon of swimmers' hair turning green is discussed. It is pointed out that the discoloration is unrelated to the chlorine in the pool water; it is most likely due to the copper content of the pool water resulting either from addition of copper-containing algicides or corrosion of copper tubing. Varius treatments are discussed, including the use of heated vegetable oil and the application of products containing the chelating agent EDTA. Some preventive measures are described, such as maintaining the pool pH between 7.4 and 7.6.

80-0303. Anonymous **Toxaphene carcinogenic in mice.** *BioScience* 29(4): 263-264; 1979.

A report is presented in which the results of an NCI bioassay test in which toxaphene was shown to cause liver cancer in 98% of male mice and 69% of female mice at doses of 198 ppm/day for 80 wk, are presented. Low doses of 99 ppm also caused cancer in 69% of males and 10% of females. The report discusses the occurrences of toxaphene contamination of foodstuffs and the environment. Some of the known effects of this pesticide on animals and humans are described. The substance is classified as a potential threat to human health.

80-0304. Jones, R. R.; Cunningham, J. (Cent. Middlesex Hosp., London, England) **Warfarin skin necrosis. The role of factor VII.** *Br. J. Dermatol.* 100: 561-565; 1979 (17 references).

Oral anticoagulant therapy has been shown to produce necrosis of cutaneous and subcutaneous tissue, usually in obese female patients. Lesions normally appear in the first week of anticoagulant therapy, with variations in their extent and severity from patient to patient. Three cases of skin necrosis due to warfarin therapy are described. Histoathological studies illustrate that the tissue necrosis is due mainly to thrombosis within the subcutaneous vasculature. In the first 2 cases, warfarin was administered iv at a loading dose of 30 mg. In the third case warfarin was given at 20 mg on day 1 and at 15 mg on day 2. When warfarin-induced skin necrosis appeared in the 3 female patients, the anticoagulant therapy was stopped altogether, or continued with heparin only, and vitamin K was administered. All 3 patients showed decreased hemoglobin levels and increased erythrocyte sedimentation rates with the onset of warfarin-induced skin necrosis. Coagulation studies showed a prolongation of prothrombin times in all 3 cases, but no relationship was found between this phenomena and the etiology of the necrotic conditions.

80-0305. Ramamoorthy, S.; Miller, D. R. (Div. Biol. Sci., Natl. Res. Counc. Canada, Ottawa, Ontario K1A OR6, Canada) **Removal of mercury and methylmercury from waste waters by sorption.** *Bull. Environ. Contam. Toxicol.* 22(1-2): 196-201; 1979 (11 references).

This study demonstrated that ground rubber and saw dust were efficient in removing mercury and methyl mercury from water. These means were effective at several point source discharge concentrations. The mercury removal was not affected by organic chemicals contained in the river water. Rubber removed a slightly higher percentage of the contaminant. Both the rubber and saw dust could be disposed of on land by common producures, but it is suggested that the saw dust might decompose faster than ground rubber and thereby release the contaminant into the soil faster. It is suggested that about a half ton of saw dust or ground rubber would be sufficient to clean up 1000 gallons of water, removing most of the mercury it contained.

80-0306. White-Stevens, R. (Author address not given) **The year of the pest.** *Clin. Toxicol.* 14(5): 599-606; 1979.

The discontinued use of pesticides, particularly DDT, has caused a resurgence of many pests in the world. Increases in screwworms, tent caterpillars, budworms, army worms, gypsy moths, and fire ants are discussed. An increase in malaria is described and attributed to the ban on DDT. The future effects of bans on pesticides, with regards to food, fiber and shelter production are presented.

80-0307. Environ. Program, UN, Nairobi, Kenya **The state of the environment: selected topics - 1979.** *Environ. Int.* 2(3): 187-200; 1979 (81 references).

A United Nations statement about the state of the environment is presented. Schistosomiasis, resistance to pesticides, noise pollution, and tourism and the environment are discussed. The benefits of pesticides are considered along with some of their disadvantages, one of which is the development of resistance to pesticides. Resistance to pesticides has been found in insects, mites,

ticks, fungi, and rodents. The level of resistant strains has increased greatly since 1947. If resistance is high enough, world health and food production would be adversely affected. The primary factors that influence the development of resistance are: the presence and frequency of resistant genes, selection pressure, number of generations per year of the pest, and the isolation of the population affected. Alternate control methods must be instituted to counteract the development of resistance. Environmental control, genetic and sterile male techniques, biological control and behavioral control, and resistance breeding are considered the best alternative approaches. Integrated pest management is recommended due to the problems encountered by using a single method.

80-0308. Courtney, K. D. (Health Effects Res. Lab., US EPA, Research Triangle Park, NC 27711) **Hexachlorobenzene (HCB): a review.** *Environ. Res.* 20(2): 225-266; 1979 (162 references).

The fungicide hexachlorobenzene (HCB) is reviewed. Toxicity to humans is covered, with an HCB-induced porphyria cutanea tarda (PCT) epidemic in Turkey used as an example. The occurrence of HCB in humans, food, wild mammals, birds, fish, and soil is discussed. Porphyrias are mentioned, with emphasis on the HCB induced porphyria, PCT. Experimental studies on HCB toxicity in rats, rabbits, guinea pigs, mice, hamsters, monkeys, dogs, sheep, pigs, chickens, quail, and kestrel are covered. The effect of HCB on reproduction and development is covered through discussion of multigeneration studies, teratology, placental transfer, and lactational transfer. Distribution/metabolism and effects of HCB on enzymes are also mentioned.

80-0309. Svendsgaard, D. J.; Courtney, K. D.; Andrews, J. E. (Health Effects Res. Lab., US EPA, Research Triangle Park, NC 27711) **Hexachlorobenzene (HCB) deposition in maternal and fetal tissues of rat and mouse. II. Statistical quantification of HCB in tissues.** *Environ. Res.* 20(2): 267-281; 1979 (5 references).

Path analysis, a body of statistical methodology, is applied to animal tissue HCB (hexachlorobenzene) concentration data. The form of path analysis being used is covered in detail and the results obtained from applying the method are discussed. (Author abstract by permission of Academic Press)

80-0310. Anonymous **The plant protection arsenal.** *Environ. Sci. Technol.* 13(11): 1335-1337; 1979.

The need to protect the world food crop from attack by various pests is emphasized. Several approaches to achieve this end are listed and discussed. Problems wtih the use of chemical synthetic pesticides are considered, and include the high cost of research and development, and the increasing occurrence of resistance among the pests to the chemicals. Some emphasis is also given to the pollution effects of pesticides.

80-0311. Stamper, J. H.; Nigg, H. N.; Allen, J. C. (Inst. Food & Agric. Sci., Agric. Res. & Educ. Cent., Univ. Florida, Lake Alfred, FL 33850) **Organophosphate insecticide disappearance from leaf surfaces: an alternative to first-order kinetics.** *Environ. Sci. Technol.* 13(11): 1402-1405; 1979 (22 references).

A new model of organophosphate insecticide disappearance from leaf surfaces is presented. Excellent agreement ($R^2 = 0.963$) with observed insecticide residue has been achieved. No statistically determined arbitrary constants appear in the model, and only the insecticide concentration at one time is required to predict its concentration at any other time. The model appears to be valid over a wide range of organophosphate types and environmental conditions. Expensive monitoring studies might now be done more efficiently and at less cost. The fundamental process governing such disappearance may be diffusion. (Author abstract reprinted by permission of the American Chemical Society)

80-0312. Delfino, J. J. (Lab. Hyg., Univ. Wisconsin-Madison, Madison, WI 53706) **Toxic substances in the Great Lakes.** *Environ. Sci. Technol.* 13(12): 1462-1468; 1979 (5 references).

An overview of the origin, distribution (in water, sediments, and fish), effects, and fate of some heavy metals and organics in the Great Lakes is presented. Among the contaminants mentioned are DDT, dieldrin, PCB's, lindane, heptachlor, heptachlor epoxide, endrin, aldrin, methoxychlor, Hg, Pb, and As. Hg, Pb, and As are considered to be of particular concern in Great Lake sediments. A map showing Hg concentrations in surface sediments of the Great Lakes is included. The PCB content of fish is also considered to be a problem. Bioaccumulation of PCB's and their passage through the food chain is discussed; PCB concentrations found in Great Lakes fish are given. The potential human health effects and evidence of PCB effects on rhesus monkeys are also discussed. Particular problems of the Lake Michigan basin are covered, including PCB's in the Sheboygan River, wastewater in the Lower Fox River, and the accumulation of PCB's in the lake trount of Lake Michigan. Control of contaminants in the Great Lakes is considered. Existing environmental statutes are listed, and some of the difficulties involved in control of contaminants are discussed.

80-0313. Keith, L. H. (Radian Corp., Austin, TX 78766) **Analysis of organic water pollutants.** *Environ. Sci. Technol.* 13(12): 1469-1471; 1979.

A list of consensus voluntary reference compounds (CVRC's) developed by the American Chemical Society's Council on Environmental Pollutants is presented. Improvements and variations in analytical methodology can be compared using these substances. The guidelines used for choosing the reference compounds are given. Among the CVPC's chosen are heptachlor, atrazine, hexachlorobenzene, biphenyl, *p,p'*-DDE, malathion, leptophos, carbon disulfide, and *α*-endosulfan.

80-0314. Neely, W. B. (Environ. Sci. Res., Dow Chem. Co., Midland, MI 48640) **Estimating rate constants for the uptake and clearance of chemicals by fish.** *Environ. Sci. Technol.* 13(12): 1506-1510; 1979 (16 references).

With the increased need for predicting the movement and distribution of chemicals in an aquatic environment, knowledge of the rate constants governing the uptake and clearance of chemicals in fish is required. In the absence of experimental data, a method is proposed for making reasonable estimations of these 2 rate constants based on the physiology of the fish and the proprties of the chemical. The credibility of the proposal is demonstrated by comparing predicted rate constants with values measured in the laboratory. Test chemicals used were DEHP, chlorpyrifos and TCDD. (Author abstract reprinted by permission of the American Chemical Society)

80-0315. Kawazu, K.; Nakajima, S.; Ariwa, M. (Dep. Agric. Chem., Okayama Univ., Tsushima, Okayama 700, Japan) **Xanthumin and 8-epi- xanthatin as insect development inhibitors from *Xanthium canadense* Mill.** *Experientia* 35(10): 1294-1295; 1979 (9 references).

In an effort to develop more natural products for the control of insect pests, a bioassay test system using *Drosophila melanogaster* as the test organism was designed. Methanol extracts of several hundred species of terrestrial and marine plants were applied dermally, orally, and respiratorily to the insects at various stages of development. Extracts of the leaves of *Xanthium canadense* were found to inhibit larval growth of the flies. Two compounds were isolated from the methanol extracts of *Xanthium canadense* leaves by conventional solvent partition and chromatography, and were identified by subsequent tests as xanthumin and 8-epi-xanthatin. Both of these compounds caused 100% mortality of *D. melanogaster* larvae at 2.5 and 5.0 mg/2 g medium after 12 days.

80-0316. Mukerjee, S. K.; Saxena, V. S.; Tomar, S. S. (Div. Agric. Chem., Indian Agric. Res. Inst., New Delhi, India) **New methylene dioxyphenyl synergists for pyrethrins.** *J. Agric. Food Chem.* 27(6): 1209-1211; 1979 (13 references).

Several new ester derivatives of alcohols derived from dillapiole have been prepared and evaluated for their synergistic efficacy toward pyrethrins against *T. castaneum* Herbst. A few of these compounds have shown comparable activity to piperonyl butoxide, a standard synergist. The relationship among the number of carbon atoms in the ester chain of these compounds, their lipophilicity, and synergistic potenty is discussed. (Author abstract reprinted by permission of the American Chemical Society)

80-0317. Marcus, C. (Dep. Entomol., Univ. Wisconsin, Madison, WI 53706) **Biologically active components of anise: toxicity and interactions with insecticides in insects.** *J. Agric. Food Chem.* 27(6): 1217-1223; 1979 (13 references).

The biological activity of components of anise tops was studied with insects. *trans*-Anethole was found to be the major insecticidal agent present in anise oil (56% by weight) derived from anise tops, with an LD50 of 75 μg/fly when topically applied to houseflies. The toxicity of 9 other anise components (anisaldehyde, estragole, anisyl alcohol, anisic acid, *p*-cresol, *p*-creosol, eugenol, hydroquinone, and acetaldehyde) to houseflies was also studied. Anethole and anisaldehyde were both found to increase the toxicity to houseflies when applied simultaneously with parathion, paraoxon, carbaryl, carbofuran, DDT, or pyrethrum. Also, anethole fed to houseflies as 0.5% of their diet resulted in increased insect mortalities due to topically applied parathion or paraoxon in comparison to flies fed a diet without anethole. Further experiments with houseflies which had been fed with anethole as part of their diet indicated that the increased toxicity of paraoxon resulted apparently from an increased penetration of the insecticide into the insect body and a retardation of its degradation to nontoxic, water-soluble metabolites. (Author abstract reprinted by permission of the American Chemical Society)

80-0318. Sokolov, M. S. (Author address not given) **Mezhdunarodnoe koordinatsionnoe soveshchanie ob'edinennoi konsul'tativnoi gruppy FAO/MAGATE po probleme Vzaimodeistvie ostatkov sel'skokhoziaistvennykh khimikatov c biotoi, pochvoi i vodoi. [International coordinating conference of joint FAO/MAGATE working group on the problem of interaction of residue of agricultural chemicals with biotope, soil and water.]** *Khim. Sel'sk. Khoz.* 17(7): 57-61; 1979 (Russian).

The results of the international symposium of the joint FAO and MAGATE of the Atomic Energy Agency working group on the interaction between agricultural chemicals and soil and water are reviewed. Among the topics discussed at the conference were the use of labeled compounds in field experiments, the fate of bound (nonextractable) compounds in the soil, and crop yield, the most effective methods of extraction of pesticide residues from the soil and food products, methodology of experiments with labeled chemicals, and interactions between chemical residues and soil and water.

80-0319. Dickson, D. (Author address not given) **Herbicide claimed responsible for birth defects.** *Nature (London)* 282(5736): 220; 1979.

Information is presented on the possible genetic effects of the herbicide oryzalin (3,5- dinitro-*N* (4), *N* (4)-dipropyl sulfanilamide). It is pointed out that among children born between January 1975 and June 1976 to male workers employed in an oryzalin production plant, 3 were born with heart deformities (2 of which died), and 1 died from pneumonia; there was also 1 miscarriage. The company manufacturing the product states that tests on rats and rabbits indicated no birth defects; no scientifically established link between oryzalin exposure and these health problems had been reported to the EPA. An EPA team has been established to study the effects of the herbicide.

80-0320. Anonymous **Defoliant companies can be sued.** *Nature (London)* 282(5738): 434-434; 1979.

Information is presented on veterans exposed to Agent Orange, which contains the defoliant 2,4,5-T and is suspected of containing the toxic contaminant dioxin. A US federal judge has ruled that chemical companies which produced Agent Orange can be sued by Vietnam veterans, who claim that they were injured by the exposure or that their children were deformed. It is suggested that the Defense Department has severely underestimated the number of soldiers exposed.

80-0321. Anonymous ***Bacillus thuringiensis* - Praparate unbedenklick. [*Bacillus thuringiensis* - preparations safe.]** *Naturwiss. Rundsch.* 32(10): 418; 1979 (German).

Environmental and hygienic evaluations of *Bacillus thuringiensis* preparations are reviewed. Comprehensive investigations demonstrated that food and fodder grown in fields treated with such preparations are safe for human and animal consumption, respectively. No harmful effects on aquatic and soil organisms have been observed. There is no accumulation in the trophic chains, nor any epidemic spread of the bacillus. *B. thuringiensis* preparations are harmless to bees and other useful insects.

80-0322. Bansode, P. C. (Indian Grain Storage Inst., Hapur, India) **Status of insecticidal resistance among field populations of stored product insects in India.** *Pesticides* 13(8): 19-20; 1979 (9 references).

Increases in resistance among insect pests attacking stored grain products to insecticides are reviewed. While resistance among these pests was negligible only 20 years ago, malathion resistant strains of *Tribolium castaneum* in at least 10 countries (1970), lindane resistant populations of *Sitoplilus oryzae* from Kenya (1972), and DDT resistant *S. oryzae* in Australia (1967) have been reported. In India malathion-spraying at the dilution rate of 1:300 is no longer effective; present practices consist of 1:100 malathion:water regimes. Laboratory studies have shown that in addition to *Tribolium* and *Sitoplilus, Oryzaephilus surinamensis* and *Rhyzopertha dominica* developed lindane and phosphine resistance.

80-0323. Westing, A. H. (Sch. Nat. Sci., Hampshire Coll., Amherst, MA 01002) **The safety of 2,4,5-T.** *Science* 206(4423): 1135; 1979.

In a letter to the editor, the safety of 2,4,5-T (including its contaminant dioxin TCDD) is discussed. It is pointed out that it has not been established whether dioxin is presently accumulating in the environment, and that presently available analytical methods are inadequate for routine programs of environmental monitoring. Calculations which indicate that a typical application of 2,4,5-T (5 kg/ha) to a right of way would yield approximately 380 μg of dioxin/ha, are given. Fifty to 75% of the dioxin would decompose quickly, and the remaining 100 μg/ha would become incorporated into the ecosystem. With a half-life of 3 yr or longer, about 40 μg/ha could remain after 4 yr, when the next application would theoretically be made. With successive applications, a steady state contamination level fluctuating between 70 and 170 μg/ha could be attained, and some local animals could attain body burdens of 10 to 100 times this (1.3-13 ng/kg). It is concluded that there is too small a margin of safety when 2,4,5-T is used.

80-0324. Blair, E. H. (Health & Environ. Sci., Corp. Res. & Dev., Dow Chemical Co., Midland, MI 48640) **The safety of 2,4,5-T.** *Science* 206(4423): 1135-1136; 1979 (11 references).

In a letter to the editor, a reply is made to claims concerning the accumulation of 2,3,7,8- tetrachloro dibenzo-*p*- dioxin (TCDD), a contaminant of 2,4,5-T, in the environment. Several studies which analyzed TCDD in various environmental samples from areas sprayed with 2,4,5-T are reviewed. TCDD could not be detected at the ppt level in fish, bottom sediment, and water; was detected in the American coot only at the ppb level; and in the mountain beaver at 3 ppt. Other studies indicated that herbicide formulations exposed to natural sunlight lost most or all of the TCDD during a single day. It is concluded that the likelihood of TCDD residues occurring in the environment from applications of the herbicide 2,4,5-T is extremely remote.

80-0325. Pearce, J. B. (Sandy Hook Lab., Natl. Mar. Fish. Serv., Highlands, NJ) **Estuaries.** *Underwater Nat.* 12(1): 29-35; 1979.

The disappearance of estuaries at an ever-increasing rate during the past 25 years is discussed. Physical destruction by dredging, filling, and spoiling, as

well as increased pollution loads, have contributed to the decreased estuarine water quality. The Hudson-Raritan Estuary is given as an example of a highly polluted estuary. It is considered to act as an enormous septic system collecting contaminants from New York City, as well as from Upstate New York. Mohawk Valley PCBs discharged into the upper Hudson River near Albany, NY have been found in Raritan fish samples ranging in concentration from 0.14 to 17.20 ppm. It is concluded that pollution abatement steps must involve the total watershed, rather than simply the cessation of local discharges. Long-range assessment, monitoring, and planning, as well as continued research programs, should be maintained to provide a baseline against which changes in estuarine and coastal water quality can be measured.

80-0326. Klisenko, M. A. (All-Union Res. Inst. Hyg. & Toxicol. Pestic. Polym. & Plast., Kiev, USSR) **Opredelenie ostatochnykh kolichestv pestitsidov v produktakh pitaniia i ob'ektakh okruzhaiushchei sredy (glavnye napravleniia razvitiia). [Determination of pesticide residues in food products and environmental products (major trends of development).]** *Zh. Anal. Khim.* 34(7): 1382-1400; 1979 (249 references) (Russian).

Literature on the methods of determination of pesticide residues in food products, fodder, water and soil is reviewed. The methods currently used for extraction of pesticides and purification of extracts include ion-exchange chromatography, liquid high pressure chromatography, gel-penetrating chromatography, and distillation. The use of chromatographic methods markedly increases the effectiveness, sensitivity and selectivity of analysis of residual amounts of pesticides. Thin-layer chromatography is noted to be one of the more widely used methods of determination of pesticide residues.

80-0327. Eidmann, H. H.; Bergman, O.; Henningsson, B.; Moller, C. (Dep. Forest Entomol., Swedish Univ. Agric. Sci., S-104 05 Stockholm, Sweden) **DDT and lindane residues on treated conifer seedlings and in soil.** *Ambio* 8(5): 214-217; 1979 (19 references).

DDT or lindane was used to dip-treat transplanted seedlings of Norway spruce and Scots pine. After treatment the seedlings were planted in scarified patches or in vegetation on a clear cut area located in central Sweden. About 20 mg DDT and DDD (TDE) or about 15 mg of lindane were detected per seedling. Residues of both insecticides diminished rapidly in the first few weeks following exposure. The seedlings demonstrated only 10% of the original contamination of DDT after a period of 1 year and only 2% of the original level of contamination with lindane. DDT and lindane content in the soil near the seedlings increased rapidly during the initial weeks following treatment of the seedlings. Soil located between seedlings showed negligible or undetectable amounts of contamination. Soil within a radius of 10 cm of the seedlings and to a depth of 20 cm contained 8-9 mg total DDT and 2-3 mg lindane.

80-0328. Anonymous **[Investigation of pesticide residues in soil.]** *Annu. Rep. Hiroshima Pref. Agric. Exp. Stn.* 1978: 24; 1979 (Japanese).

Soil residues of chlorothalonil, a pesticide applied in large quantities to protect tomato plants from *Phytophthora infestans*, were investigated. The time period for 50 and 80% disappearance from soil were found to be 3-5 and 10 wk, respectively. It was also found that the residue of chlorothalonil primarily remained in a layer 1 cm below the soil surface.

80-0329. Anonymous **[Investigation on the confirmation of the safety of pesticide residues.]** *Annu. Rep. Hiroshima Pref. Agric. Exp. Stn.* 1978: 24; 1979 (Japanese).

Pesticide residues on or in tomatoes were investigated after TPN and chlorothalonil were applied using standard pesticide application procedures. Experimental application and sampling was carried out in 7 fields. In 1 field, in spite of standard application and harvest procedures, the residue was more than the threshold value of 1 ppm.

80-0330. Anonymous **[Investigation on counter measures for pesticides residues.]** *Annu. Rep. Hiroshima Pref. Agric. Exp. Stn.* 1978: 24; 1979 (Japanese).

Aquatic residues of molinate (*S*-ethyl hexahyfrol-*H*-azepine- 1-carbothoate) were investigated at 30 points in water of paddy fields and in river water. The half life of molinate was estimated to be about 4 days. Residues of PCNB (quintozene) on or in an edible chrysanthemum and in soil were investigated. It is reported that the amount of PCNB was large, and a long time was required for PCNB disappearance.

80-0331. Kishk, F. M.; Abu-Sharar, T. M.; Bakry, N. M.; Abou-Donia, M. B. (Dep. Soil & Water Sci., Alexandria Univ., Alexandria, Egypt) **Sorption-desorption characteristics of methyl parathion by clays.** *Arch. Environ. Contam. Toxicol.* 8(6): 637-645; 1979 (11 references).

Methyl parathion [*O,O*-dimethyl *O*- (4-nitrophenyl) phosphorothioate] adsorption was studied on montmorillonie, kaolinite, halloysite, natural zeolite, ion exchange resins and calcium carbonate. Methyl parathion was highly adsorbed by montmorillonite, followed by zeolite, and very little adsorption was obtained on kaolinite and halloysite. Calcium carbonate did not exhibit any adsorption. The values of the partial molar free energy ΔG *bar* were calculated for all systems. For the montmorillonite-methyl parathion system, the calculated partial molar heat of adsorption ΔH *bar*, and the conformity of the data to the Freundlich equation indicated a possible physical mechanism of adsorption. Increasing acetone concentration decreases methyl parathion adsorption and dehydration increased adsorption in the nonaqueous system. Moreover, the increased adsorption on the swollen clay indicated that methyl parathion was adsorbed on the interlamellar surfaces of the clay. This was also in agreement with the results of the desorption studies, since the insecticide was not desorbed using the same aqueous acetone solution. This indicated that methyl parathion was adsorbed as a water-insoluble organic compound. (Author abstract by permission)

80-0332. Barles, R. W.; Daughton, C. G.; Hsieh, D. P. H. (Dep. Environ. Toxicol., Univ. California, Davis, CA 95616) **Accelerated parathion degradation in soil inoculated with acclimated bacteria under field conditions.** *Arch. Environ. Contam. Toxicol.* 8(6): 647-660; 1979 (13 references).

The feasibility of decontaminating soil at parathion spillage or disposal sites by inoculation with a highly acclimated culture of parathion degrading bacteria was demonstrated under *in situ* field conditions. The acclimated culture (AC), capable of utilizing parathion as a sole carbon and energy source, was inoculated into Yolo silt loam soil in which parathion was applied at rates up to 5000 kg/ha. The AC was shown to be capable of completely degrading parathion in soil containing up to 1250 kg/ha of parathion within 35 days. A slower rate of parathion degradation by the AC was observed when the pesticide was applied as the commercial 46.5% emulsifiable concentrate than when applied as the 98% technical grade. The ability of the AC to degrade parathion deteriorated at ap-

plication rates greater than 1250 kg/ha. The AC may have been adversely affected by the accumulation of the parathion hydrolytic products, *p*-nitrophenol and ionic diethyl thiophosphate, which were tentatively identified in soil samples. (Author abstract by permission)

80-0333. Coleman, W. E.; Tardiff, R. G. (Health Effects Res. Lab., US EPA, Cincinnati, OH 45268) **Contaminant levels in animal feeds used for toxicity studies.** *Arch. Environ. Contam. Toxicol.* 8(6): 693-702; 1979 (12 references).

Samples of commercial feeds for laboratory rats, guinea pigs, cats, monkeys, rabbits, and hamsters were collected and analyzed qualitatively and quanitatively for selected antibiotics, trace metals, pesticides (organophosphates and chlorinated hydrocarbons), natural agents, and polychlorinated biphenyls (PCBs). The results indicated that antibiotics, parathion, diazinon, aldrin, and aflatoxins were not detected, whereas, metals, chlorinated hydrocarbon pesticides (except aldrin), and PCBs were continually present. Malathion and estrogen were found occassionally. (Author abstract by permission)

80-0334. Geller, A. (Fachbereich Biol., Univ. Konstanz, D-7750 Konstanz, BRD) **Sorption and desorption of atrazine by three bacterial species isolated from aquatic systems.** *Arch. Environ. Contam. Toxicol.* 8(6): 713-720; 1979 (24 references).

The isolates *Acinetobacter* sp., *Cytophaga* sp. and *Pseudomonas fluorescens* represent different morphological and physiological types of bacteria. They accumulate atrazine (2-chloro- 4-(ethylamino)- 6-(isopropylamino)- 5-triazine) to different levels. Accumulation expressed by the ratio of atrazine sorbed per volume of bacteria to atrazine per the same volume of water amounted to 11 for *Acinetobacter* sp., 8.6 for *Cytophaga* sp. and 6.2 for *Pseudomonas fluorescens.* Accumulation ratios were proportional to the surface areas of the organisms. Single cells of *Acinetobacter* sp., sorbed amounts of atrazine comparable to the other species investigated, whereas cell aggregates, formed a few months after isolation, sorbed an order of magnitude less. A large portion of atrazine accumulated by the bacteria could be rapidly desorbed. A remainder of 10% was bound by *Cytophaga* sp. and *Pseudomonas fluorescens. Acinetobacter* sp. bound 70-80% of the atrazine sorbed. In the range of 0.3-3 mg/l atrazine, there was a linear relationship between the amount of non desorbable herbicide and its concentration in the incubation medium. (Author abstract by permission)

80-0335. Duinker, J. C.; Hillebrand, M. T. J. (Netherlands Inst. Sea Res., Texel, The Netherlands) **Mobilization of organochlorines from female lipid tissue and transplacental transfer to fetus in a harbour porpoise (*Phocoena phocoena*) in a contaminated area.** *Bull. Environ. Contam. Toxicol.* 23(6): 728-732; 1979 (21 references).

A 20-cm harbor porpoise fetus was analyzed for organochlorine residue content. PCB concentrations in kidney, liver, and subcutaneous fat of the fetus were found to be 34, 50, and 59 μg/g tissue, respectively. *p,p'*-DDE and *p,p'*-DDT concentrations were also high (7.2-9.2, and 4.5-12.5 μg/g, respectively), while HCB (hexachlorobenzene) concentrations were lowest at 0.2-0.3 μg/g. Mobilization from the mother's lipid tissue and transplacental transfer is the likely source of the lipophilic OCs presence in the fetal tissue.

80-0336. Wilkes, P. S. (US FDA, Atlanta, GA 30309) **Detection of bis-(trichloromethyl) disulfide in strawberries.** *Bull. Environ. Contam. Toxicol.* 23(6): 820-824; 1979 (8 references).

Fresh whole strawberries collected from a wholesale market in Florida were analyzed for captan residues. The fruit samples were extracted with acetonitrile, followed by petroleum ether partitioning and chromatographic separation on a fluorisil column. GC-MS analysis was performed and electron impact and chemical ionization spectra were obtained. During the assay for captan bis- (trichloromethyl) disulfide, a compound structurally similar to the trichloro methylthio moiety of captan, was identified. This compound was found to be present as an impurity in technical captan samples.

80-0337. Engelhardt, G.; Walloefer, P. R.; Ziegler, W. (Bayer. Landesanst. Bodenkultur & Pflanzenbau, Abt. Pflanzenschutz, D-8000 Munich, BRD) **Degradation of the phenylamide herbicides monolinuron and solan by *Fusarium oxysporum* Schlecht.** *Chemosphere* 8(10): 725-730; 1979 (11 references).

The herbicides monolinuron and solan (pentanochlor) were removed completely from culture media within 3 weeks of incubation during the growth of *E. oxysporum* Schl. Four different metabolites were isolated from solan, from which 3-chloro-4- methylacetanilide, the main metabolite, and 3-chloro-4- methylaniline were identified. Six metabolites were formed from monolinuron, and 3 were identified as: 4-chloroacetanilide, 3-(4-chlorophenyl)- 1-methylurea and a hydroxylated 4-chloroacetanilide.

80-0338. Kilzer, L.; Scheunert, I.; Geyer, H.; Klein, W.; Korte, F. (Inst. Okol. Chem., Ges. Strahlen & Umseltforsch. mbH Muenchen, D-8042 Neuherberg, DDR) **Laboratory screening of the volatilization rates of**

organic chemicals from water and soil. *Chemosphere* 8(10): 751-761; 1979 (51 references).

A new, simple, short-time, direct method for determining volatilization rates for chemicals from water and soil under laboratory conditions is presented. Three different soil types, sandy, loamy, and humus soils, were used in these studies. Volatilization rates were determined for hexachlorobenzene, 2,5,4′-trichlorophenol, 2,4,6,2′,4′-pentachloro biphenyl, aldrin, hexachloro cyclopentadien, pentachlorophenol (PCP), biphenyl, 2,4,6-trichlorophenol, *p*-chloraniline, and Kepone (chlordecone). A comparative ranking of chemicals was obtained which can be extrapolated to the real environment if a number of factors are considered such as pH, soil composition, biotic or abiotic conversion, and incorporation into macromolecules.

80-0339. Lotz, F.; Nitz, S.; Korte, F. (Inst. Okol. Chem., Ges. Strahlen & Umweltforsch. mbH, D-8050 Freising-Weihenstephan, BRD) **Photomineralisierung adsorberter organischer Chemikalien im Mikromassstab. [Photomineralization of adsorbed organic chemicals on a micro scale.]** *Chemosphere* 8(10): 763-768; 1979 (9 references) (German).

The mineralization of organic compounds (lindane, hexachlorobenzene, dieldrin, pentachlorophenol (PCP), 4,4′-DDT, 3,3′,4,4′- PCB, and benzopyrene), adsorbed on silica gel of highest purity, under the effect of UV light (2 hr exposure) was studied on a micro scale. Relative to 22 g of adsorbant, the input of the substances was 10.82 mg of lindane, 11.05 mg of hexachlorobenzene, 7.20 mg of dieldrin, 9.97 mg of pentachlorophenol, 5.82 mg of 4,4′-DDT, and 5.41 mg of 3,3′,4,4′- PCB. The amount of CO_2 formed was 0.016 mg for lindane, 0.097 mg for hexachlorobenzene, 0.032 mg for dieldrin, 0.50 mg for pentachlorophenol, 0.023 mg for 4,4′-DDT, and 0.16 mg for 3,3′,4,4′- PCB. The rate of mineralization (in % of the input) was 0.16% for lindane, 0.9% for hexachlorobenzene, 0.3% for dieldrin, 5% for pentachlorophenol, 0.25% for 4,4′-DDT, and 1.6% for 3,3′,4,4′- PCB.

80-0340. Parlar, H.; Korte, F. (Inst. Okol. Chem., Ges. Strahlen & Umweltforsch. mbH Muenchen, D-8050 Freising-Attaching, BRD) **The significance of quantum yield during determination of environmental photochemical degradability of organic compounds.** *Chemosphere* 8(10): 797-807; 1979 (12 references).

Examples are offered which demonstrate that the determination of quantum yield is a suitable technique to draw possible correlations between photochemical environmental stability of an organic compound and the structural features of that particular compound. The examples discussed include chlordene derivatives, 4-amino-3-methylthio-1,2,4- triazin-5 (4H)-ones, 1,2,4-triazin-5 (4H)-ones, and monosubstituted chlorobenzenes.

80-0341. Lord, K. A.; Helene, C. G.; De Andrea, M. M.; Ruegg, E. F. (Rothamsted Exp. Stn., Harpenden, England) **Sorcao e moviemento de pesticidas em camadas delgadas de solos Brasileiros. [Sorption and movement of pesticides on thin layer plates of Brazilian soils.]** *Cienc. Cult. (Sao Paulo)* 31(2): 174-178; 1979 (6 references) (Portuguese).

Experiments were performed to determine the sorption and movement rates of pesticides on different types of soils. Lindane, parathion, malathion, and carbaryl were applied to 1 spot on thin layers of soil, then extracted from them. High organic content seemed to be the main factor causing strong adsorption and low movement rates. Aldrin and DDT moved the least on any of the soil types. Carbaryl was the least strongly sorbed insecticide on all of the soils. Lindane, parathion and malathion showed mixed results for various soil types.

80-0342. Korte, F. (Inst. Chem. Tech., Univ. Muenchen, Freising-Weihenstephan, BRD) **Ecotoxicology of Belgard EV.** *Desalination* 30(1-3): 411-424; 1979 (8 references).

Ecotoxicological Profile Analysis is described which allows comparative ecotoxicological screening and testing of the behavior of chemicals in a set of studies. Individual environmental conditions are simulated and controlled during these tests. The tests comprise simulated technological processes such as the aerobic degradation with activated sludge, aerobic degradation in garbage pits, and the incineration of waste; simulated biological processes such as excretion, biodegradation/ metabolism, and retention/ bioaccumulation; complete degradation under simulated atmosphere conditions; and simulated transport processes including evaporation, solubility, distribution in water/soil systems, and solvent systems, and seepage. Results showed that, in general, Belgard EV when compared to 25 other chemicals, was retained to a low degree by rats, was accumulated little by algae, formed some mineralization products in activated sludge tests, and was degraded over 10% in photochemical tests. Some of the pesticides which were compared with Belgard EV included hexachlorobenzene, aldrin, PCP, biphenyl, monolinuron, 2,4-D, and quintozene.

80-0343. Vossbrinck, C. R.; Coleman, D. C.; Woolley, T. A. (Dep. Zool. & Entomol., Colorado State Univ., Fort Collins, CO 80523) **Abiotic and biotic factors in litter decomposition in a semiarid grassland.** *Ecology* 60(2): 265-271; 1979 (31 references).

The differential effects of 3 treatment regimes (abiotic, microbial, and mesofaunal) on the rate of decompositon of blue grama (*Bouteloua gracilis*) leaf litter were studied. To exclude or inhibit growth, the abiotic treatment consisted of 53 μm-mesh bags treated with saturated aqueous solutions of copper sulfate ($CuSO_4$) or mercuric

chloride ($HgCl_2$), Fifty three μm nylon-mesh without chemical treatment to exclude copper mesofauna (microbial treatment), and 1 mm nylon mesh to allow access to mesofauna were also used. After 9 mo 15.2% of the grass litter was decomposed in the microbial treatment, 29.4% was decomposed in the mesofaunal treatment, while only 7.2% of the litter had disappeared from the abiotic treatment area. C:N ratios were lowest in the microbial treatment area and highest (by more than 50%) in the abiotic regimen, indicating lower decompositin rates in the latter. The 53 μm mesh, but not the 1 mm mesh size class, also excluded mesofauna such as mites and insects which are important in the decompositon process.

80-0344. Calamari, D.; Galassi, S.; Da Gasso, R. (Ist. Ric. Acque, CNR, Milan, Italy) **A system of tests for the assessment of toxic effects on aquatic life: an experimental preliminary approach.** *Ecotoxicol. Environ. Saf.* 3(1): 75-89; 1979 (33 references).

Work on the aliphatic amine, dimethyl, is presented in a system used to experimentally assess toxicity to aquatic life. The method may also be applied to other compounds, including pesticides, which are potential contaminants of aquatic environments. Under the testing procedure, acute toxicity tests on 3 organisms of different trophic levels, persistence, biodegradability, and chronic toxicity assays are conducted. For dimethyl, the 96 hr IGC50 (growth inhibiting concentration), and 24 hr IC50 (immobilization concentration) for *Daphnia magna*, and the 96 hr LC50 for *Salmo gairdneri* were performed. Bacterial degradation of dimethyl was inhibited by 100 mg/l of the compound. Chronic toxicity tests were performed by exposing rainbow trout to dimethyl for 30 days at levels of 10 mg/l. Factors that affected the outcome of the tests, such as water hardness, are discussed.

80-0345. Nigg, H. N.; Brooks, R. F.; Bullock, R. C. (Agric. Res. & Educ. Cent., Univ. Florida, Lake Alfred, FL 33850) **Chlordane residues in Florida citrus soils.** *Fla. Entomol.* 62(1): 54-58; 1979 (15 references).

Granular 10G-chlordane was applied 4 times to 0.91 ha plots in 20 yr old Hamlin orange groves near Lake Alfred, Florida and in a Valencia orange grove near Ft. Pierce, FL. Application rates were at 5.6, 8.4, and 11.2 kg AI/ha levels. At these application rates, chlordane remained in the first 2.5 cm of soil and reached ppb levels after about 1 yr. No residues were found in the fruits or leaves at or above 5.0 ppb levels. The chemical demonstrated a pseudo-first order degradation rate with a half-life of 27-72 days.

80-0346. Kureishy, T. W.; George, M. D.; Gupta, R. S. (Natl. Inst. Oceanogr., Goa 403004, India) **DDT concentration in zooplankton from the Arabian Sea.** *Indian J. Mar. Sci.* 7(1): 54-55; 1978 (8 references).

Zooplankton samples were collected from the Arabian Sea by net and were analyzed for total DDT (t-DDT) by gas chromatography. The samples consisted of copepods, chaetognaths, decapods, and ostracods. High concentrations of t-DDT were found to be dependent on the fat content and varied from 0.05 to 3.21 ppm (wet weight). BHC and PCB were also present. It was evident from the study that plankton between Bombay and Goa contain high levels of total DDT. Since zooplankton constitute the major source of food for higher animals in the food chain these high pesticide levels are seen as some cause for concern.

80-0347. Tiraferri, S.; Amadei, V.; Cecchetti, M. (Lab. Prov. Ig. & Profilassi, Reparto Chim. Rimini, Rimini, Italy) **Indagine sui residui di fungicidi a nucleo benzimidazolico nelle fragole del comprensorio di Cesena. [Inquiry on pesticide residues in strawberries in the territory of Cesena.]** *Ind. Aliment. (Pinerolo, Italy)* 17(11): 837-840; 1978 (11 references) (Italian).

Benomyl and thiophanate methyl residues were determined in 100 strawberry samples harvested in the Cesena area in 1977 and 1978. The residues were determined colorimetrically as methylbenzimidazol- 2-yl carbamate (MBC). The MBC levels were in the range of 0.05-0.40 ppm in 55% of the samples, in the range of 0.4-1.0 ppm in 12%, and above 1 ppm in 4%. The 0.4 ppm limit was exceeded by 5% of all samples in 1977 and 23% of all 1978 samples.

80-0348. Iwata, Y.; Dusch, M. E.; Carman, G. E.; Gunther, F. A. (Dep. Entomol., Univ. California, Riverside, CA 92521) **Worker environment research: residues from carbaryl, chlorobenzilate, dimethoate, and trichlorfon applied to citrus trees.** *J. Agric. Food Chem.* 27(6): 1141-1145; 1979 (14 references).

Carbaryl, chlorobenzilate, dimethoate, and trichlorfon insecticide formulations were applied at the highest recommended dosages to California lemon and orange trees. Dislodgable foliar residues are herein reported to provide a basis for determining potential exposures of agricultural workers who come into continuous and prolonged contact with the treated foliage. Fruit was sampled about 60 days postapplication, and the edible portions (pulp) of the fruit after rind removal were analyzed for the presence of persisting residues; analytically significant pulp residues were absent. (Author abstract reprinted by permission of the American Chemical Society)

80-0349. Smith, A. E. (Res. Stn., Agric. Canada, Regina, Saskatchewan S4P 3A2, Canada) **Transformation of [^{14}C] diclofop-methyl in small field plots.** *J. Agric. Food Chem.* 27(6): 1145-1148; 1979 (6 references).

The degradation of the herbicidal ester ^{14}C diclofop-methyl, in soil, applied at a rate of 1.25 kg/ha, was studied under field conditions in small sandy loam plots. The plots, following treatment in May of 1978, were extracted at regular intervals using aqueous acidic acetonitrile and the extracts analyzed using radiochemical and gas chromatographic techniques to monitor the herbicide breakdown. In addition, the polar solvent extracted soils were oxidatively combusted to determine bound residue formation. During the growing season there was a loss of extractable, and an increase in nonextractable, radioactivity so that by October only 15% of the applied ^{14}C was solvent recoverable, while 37% was associated with the soil in a bound form. At all sampling dates the major soil transformation product was diclofop-acid, with 4-(2,4-dichlorophenyl) phenol as a minor metabolite. Minute traces of 4-(2,4- dichlorophenoxy) phenetole and 4 other degradation products were also detected. (Author abstract reprinted by permission of the American Chemical Society)

80-0350. Lane, L. G.; Ammrman, G. R.; Lane, H.*; Muir, W. M. (Dep. Nutr. & Food Sci., Univ. Kentucky, Lexington, KY 40506) **A comparison of the influence of thermal processing and broiling on naturally occurring and spiked residues of 1,1,1-trichloro- 2,2-bis (*p*- chlorophenyl) ethane and its metabolites in ground beef.** *J. Agric. Food Chem.* 27(6): 1156-1159; 1979 (22 references).

Raw and processed samples of ground beef containing naturally occurring residues of 1,1,1-trichloro- 2,2-bis (*p*- chlorophenyl) ethane (DDT) and its metabolites were compared with the same ground beef to which an ethanol-water solution of *p,p'*-DDT had been added. Two treatments, a 104°C steritort process for 342 min and broiling patties for 4 min each side, were found to cause different losses of pesticides. No difference existed between method of heating with respect to 1,1-dichloro- 2,2-bis- (*p*-chlorophenyl) ethane (DDD, TDE) and 1,1-dichloro- 2,2-bis (*p*- chlorophenyl) ethylene (DDE) in nonspiked or spiked samples. Nonspiked samples decreased in DDT content ($P < 0.01$) on steritort processing and broiling. Spiked samples, however, lost DDT on steritoring ($P < 0.05$) but not during broiling. Total residues (DDE + DDD + DDT) also differed between spiked and nonspiked samples. Results indicated that research with pesticide residues should be conducted on naturally contaminated rather than artifically spiked matrices. (Author abstract reprinted by permission of the American Chemical Society)

80-0351. Gile, J. D.; Gillett, J. W. (Terr. Syst. Div., Corvallis Environ. Res. Lab., US EPA, Corvallis, OR 97330) **Fate of selected fungicides in a terrestrial laboratory ecosystem.** *J. Agric. Food Chem.* 27(6): 1159-1164; 1979 (11 references).

The dispositions of ^{14}C-labeled pentachloro nitrobenzene (PCNB; quintozene), 2 of its analogs, pentachlorophenol (PCP) and hexachlorobenzene (HCB), and captan were examined as seed-protectant coatings in a terrestrial microcosm chamber (TMC) in comparison to a reference compound, HEOD (dieldrin). The TMC contained a synthetic soil medium, agricultural crops, numerous invertebrates, and a gravid gray-tailed vole (*Microtus canicaudus*). Captan and PCP degraded more rapidly in soil and plants than did PCNB, which was degraded somewhat more quickly than HCB and HEOD. By 45 days postplanting, total soil residues (parent + metabolites + bound residues) had declined from a nominal 3 ppm to about 1 ppm for all chemicals but captan (0.26 ppm), while parent residues became undetectable for PCP and captan. Residues in invertebrates and the vole were low for all chemicals, but HCB and HEOD showed ecological magnification indices (EMs) in the vole of 17.7 and 2.1, respectively, as compared to 1.2 for PCNB. None of the chemicals adversely affected vole survival, although the PCNB-exposed vole had no surviving pups. Only HEOD greatly decreased cricket survival. (Author abstract reprinted by permission of the American Chemical Society)

80-0352. Acher, A. J.; Dunkelblum, E. (Div. Soil Residues Chem., Inst. Soil & Water, ARO, Volcani Cent., Bet Dagan, Israel) **Identification of sensitized photooxidation products of bromacil in water.** *J. Agric. Food Chem.* 27(6): 1164-1167; 1979 (19 references).

The dye sensitized photolysis of aerated aqueous solutions of bromacil (5-bromo-3- *sec*-butyl-6-methyluracil) exposed to solar irradiation has been investigated. The major product, formed in 83% yield, has been isolated and identified as a mixture of diastereoisomers of 3-*sec*- butyl-5-acetyl-5- hydroxyhydantoin. The techniques used were a combination of gas chromatography- mass spectrometry, proton and carbon-13 nuclear magnetic resonance, and infrared spectroscopy. In addition, silylation, reduction, and oxidation of the photooxidation production were carried out for further confirmation of the proposed structure. (Author abstract reprinted by permission of the American Chemical Society)

80-0353. Newsome, W. H. (Food Res. Div., Health Prot. Branch, Food Dir., Dep. Natl. Health & Welfare, Tunney's Pasture, Ottawa, Ontario K1A OL2, Canada) **Residues of mancozeb, 2-imidazoline, and ethleneurea in tomato and potato crops after field treatment with mancozeb.** *J. Agric. Food Chem.* 27(6): 1188-1190; 1979 (8 references).

Mancozeb, 2-imidazoline, and ethyleneurea residues were determined in tomato and potato crops at various intervals for 28 days after field treatment with mancozeb. On tomato fruit mancozeb persisted for 28 days while no residues were found in potato tubers. Insignificant residues of 2-imidazoline were found in either crop, and low levels (< 0.04 ppm) of ethyleneurea were present in

tomatoes up to 28 days after spraying. Ethyleneurea was not detectable in potato tubers. (Author abstract reprinted by permission of the American Chemical Society)

80-0354. Cheung, M. W.; Mingelgrin, U.; Biggar, J. W.* (Dep. Land Air Water Resour., Univ. California, Davis, CA 95616) **Equilibrium and kinetics of desorption of picloram and parathion in soils.** *J. Agric. Food Chem.* 27(6): 1201-1206; 1979 (19 references).

The desorption of picloram from Palouse silt, parathion from Panoche clay loam, and parathion from Palouse silt loam was investigated using a flow system. The desorption-kinetic reaction constant, k_o, was calculated from the specific desorption, $(x/m)_d$, as a function of time. The k_o values at 25°C were 0.457, 0.099, and 0.011 for the above 3 soil-pesticide systems, respectively. The standard enthalpy for the equilibrium adsorption was compared with the enthalpies of activation for the kinetic adsorption and desorption processes. The interpretation of the activation parameters for each system was supplemented by x-ray diffraction data. Hypotheses concerning the mechanisms involved in the desorption process for these chemicals in these soils are discussed. (Author abstract by permission of the American Chemical Society)

80-0355. Dumas, T.; Bond, E. J. (Res. Inst., Agric. Canada, London, Ontario N6A 5B7, Canada) **Relation of temperature to ethylene dibromide desorption from fumigated wheat.** *J. Agric. Food Chem.* 27(6): 1206-1209; 1979 (5 references).

The desorption of ethylene dibromide from fumigated wheat aerated at temperatures of 0-45°C as determined by extraction with 2 different solvents and by steam distillation was found to increase as the temperature decreased. The maximum amount of extractable residue was obtained with an acetone-water mixture while petroleum ether extracted only the less-tightly bound portion. Desorption of this portion seemed to be inversely related to temperature and the effect was found to be reversible. Labeled ehylene dibromide was used to substantiate the results found by chemical analysis and to determine residue rates of desorption at different relative humidities. Considerably greater desorption was found to occur at high rather than at low humidities. (Author abstract reprinted by permission of the American Chemical Society)

80-0356. Khan, S. U.; Marriage, P. B. (Res. Branch, Chem. & Biol. Res. Inst., Agric. Canada, Ottawa, Ontario K1A 0C6, Canada) **Uptake of gylphosate and *N*-nitrosoglyphosate from soil by oat plants.** *J. Agric. Food Chem.* 27(6): 1398-1400; 1979 (8 references).

Absorption of glyphosate and *N*-nitrosoglyphosate from soil treated with high rates of these compounds and their translocation in oat plants was observed in a greenhouse experiment. *N*-Nitrosoglyphosate moved more readily into the root and subsequently into the shoot of oat plants than glyphosate. Formation of *N*- nitrosoglyphosate in soil and its uptake by plants under normal field conditions is not expected. (Author abstract reprinted by permission of the American Chemical Society)

80-0357. Brown, R. H.; Purnell, C. J. (Occup. Hyg. & Med. Lab., Health & Saf. Executive, London NW2 6LN, England) **Collection and analysis of trace organic vapour pollutants in ambient atmospheres. The performance of Tenax-GC adsorbent tube.** *J. Chromatogr.* 178(1): 79-90; 1979 (36 references).

The technique by which organic contaminants in ambient air are analyzed by adsorption on porous polymers and subsequent thermal desorption into a gas chromatograph is gaining in popularity. We present here an analysis of the adsorption characteristics of one of the commonly used adsorbents, Tenax-GC. The capacity of this adsorbesnt to collect a variety of organic vapours has been investigated with respect to changes in sampling flow-rate, temperature, vapour concentration and humidity. Safe sampling volumes are tabulated for 71 organic compounds, and a plot is presented for the interpolation of estimated values for unlisted compounds. (Author abstract by permission)

80-0358. Cooke, M.; Khallef, K. D.; Nickless, G.; Roberts, D. J. (Dep. Inorg. Chem., Univ. Bristol, Bristol BS8 1TS, England) **Rapid determination of DDT and related compounds in soils via carbon skeleton gas chromatography mass spectrometry.** *J. Chromatogr.* 178(1): 183-191; 1979 (8 references).

The levels of DDT and related compounds in soil samples from an apple orchard have been determined. Extraction of residues was achieved by cyclic steam extraction and by conventional solvent extraction methods allowing comparison of the 2 methods. Determination of the organochlorine residues present in the extracts was performed by gas-liquid chromatography electron-capture detection and by carbon skeleton gas chromatography mass spectrometry. Excellent agreement between the 2 determination techniques was achieved. Prior to application of *p,p'*-DDT, a value of approximately 0.4 ppm was obtained for ΣDDT in the soil. The major component of this total was DDE. After spraying the apple trees with technical grade *p,p'*-DDT, ΣDDT for the soil rose to 0.6 ppm. This increasee was due to translocation of *p,p'*-DDT from the trees. (Author abstract by permission)

80-0359. Menzies, D. R.; Pree, D. J.; Fisher, R. W.; Chisholm, D. (Vineland Res. Stn., Agric. Canada,

Vineland Station, Ontario LOR 2EO, Canada) **Correlation of spray coverage ratings, and phosmet residues with mortality of Oriental fruit moth larvae.** *J. Econ. Entomol.* 72(5): 721-724; 1979 (9 references).

Spray coverage, as evaluated by fluorescent dye deposits and phosmet residues, was correlated with mortalities of 1st instars of *Grapholitha molesta* (Busck) placed on field-sprayed peach foliage. Higher volumes per ha resulted in the highest and most uniform coverage ratings. Residue deposits were highest at highest application rates, but the relationship was not proportional. Mortality of Oriental fruit moth larvae was higher throughout the test period at higher application rates. A residue decay-rate model, which incorporated several cumulative environmental factors, gave a better correlation than did an asymptotic regression model. Larval mortality was expressed as a linear function of coverage rating. (Author abstract by permission)

80-0360. Mensah, G. W. K.; Watters, F. L.; Webster, G. R. B. (Agric. Canada, Res. Stn., Winnipeg, Manitoba R3T 2M9, Canada) **Insecticide residues in milled fractions of dry or tough wheat treated with malathion, bromophos, iodofenphos, and pirimiphos- methyl.** *J. Econ. Entomol.* 72(5): 728-731; 1979 (13 references).

Water-based emulsions of malathion, bromophos, iodofenphos, and pirimiphos-ethyl were applied at 2 dosage rates of No. 2 C. W. red spring wheat of 12 and 16% moisture content to compare residue distribution in fractions milled from wheat samples stored over a period of 6 mo. Residue determinations were performed by GLC. High levels of insecticide residues were contained in the bran and middlings. Significantly less ($P < 0.05$) malathion than bromophos, iodofenphos, or pirimiphos-methyl was found in the bran and middlings after 6 mo of storage of treated wheat. Comparatively smaller amounts of insecticide residue were found in the flour than in the bran or middlings. Less iodofenphos than malathion, bromophos, or pirimiphos-methyl occurred in the flour. Pirimiphos-methyl degraded at a comparatively slower rate than malathion, bromophos, or iodofenphos. Residues recovered from fractions of wheat of 16% moisture content were generally lower than residues found in wheat fractions of 12% moisture content. (Author abstract by permission)

80-0361. Watters, F. L.; Mensah, G. W. K. (Res. Stn., Agric. Canada, Winnipeg, Manitoba R3T 2M9, Canada) **Stability of malathion applied on stored wheat for control of rusty grain beetles.** *J. Econ. Entomol.* 72(5): 794-797; 1979 (6 references).

Emulsion sprays of malathion containing 83.6% AI were applied to dry (11.7% moisture content) and tough (16.8% moisture content) wheat at 8 or 12 ppm to determine the stability of the insecticide at different storage temperatures during 9 months. Bioassays with adults of *Cryptelestes ferrugineus* (Stephens) showed that malathion persisted for a longer period on dry or tough wheat stored in a farm granary at -31.5° to 18°C or in the laboratory at 10°C than in grain stored at 20° or 30°C. Residue analysis showed a gradually increasing rate of breakdown of the insecticide on dry or tough wheat stored in the farm granary and at 10°C; the breakdown rate was more rapid at 20° than at 10°, and most rapid at 30°C. (Author abstract by permission)

80-0362. Allen, J. D.; Davis, D. E.* (Dep. Bot. & Microbiol., Agric. Exp. Stn., Auburn Univ., Auburn, AL 36830) **The effects of fluometuron on a salt marsh ecosystem.** *J. Environ. Qual.* 8(4): 566-571; 1979 (8 references).

A salt marsh on Sapelo Island, Georgia, dominated by a monospecific stand of spartina (*Spartina alterifora* Loisel) was treated with fluometuron [1,1-dimethyl-3- (α,α,α,- trifluoro -*m*- tolyl) urea]. Treatments were: spraying once each yr with 90,000 ppm; spraying 30 times (twice each day for 5 consecutive days in 3 consecutive mo) with 1000, 100, 10, 1, or 0 ppm; or flooding 30 times (frequency as described above) with 100 or 0 ppm. One-half of each plot was re-treated in the same manner the second yr while the other half was left untreated. Effects on spartina, perwinkle snails (*Littorinia irrorata* Say), and horse mussels (*Gukensia demissus* Dillwyn) were measured 4 mo after the first treatment. Only spraying once with 90,000 ppm fluomeuron or 30 times with 1000 ppm significantly reduced fresh weight, dry weight, or number of shoots of spartina and re-treatment the second yr at the same rates did not increase the effect. The spartina on the plots treated the first yr but not retreated the second yr recovered completely. One yr after the last of 30 sprayings with 1000 ppm or 1 spraying with 90,000 ppm, there were significant levels of fluometuron residue in the spartina harvested from these plots. Flooding 30 times with 100 ppm of fluometuron did not significantly decrease the total fresh or dry weight of spartina, but did cause visible injury symptoms and did decrease the number of shoots. Flooding 30 times with 100 ppm was nearly as toxic as spraying 30 times with 1000 ppm. Neither flooding nor spraying adversely affected the number or weight of snails. The snails were not confined to the plots but fluometuron residues in them reflected the treatment rates so migration into or out of plots must have been mimimal. Flooding with 100 ppm fluometuron did not adversely affect the mussels. (Author abstract by permission)

80-0363. Oliver, J. E. (Pestic. Degrad. Lab., Agric. Environ. Qual. Inst., SEA, USDA, Beltsville, MD 20705) **Volatilization of some herbicide related nitrosamines from soils.** *J. Environ. Qual.* 8(4): 596-601; 1979 (14 references).

The volatilization of 4 nitrosamines from soil was studied under laboratory conditions. From 30 to 80% of the low molecular weight nitrosamines that were surface-applied volatilized within a few hr. Incorporation of nitrosamines into the soil reduced both the extent and rate of volatilization. Most of the nitrosamine volatization occurred within the first few days; this behavior contrasted with that of 2 dinitroaniline herbicides, which continued to volatilize for several wk. (Author abstract by permission)

80-0364. Baker, J. L.; Laflen, J. M. (Iowa State Univ., SEA, ARS, USDA, Ames, IA) **Runoff losses of surface-applied herbicides as affected by wheel tracks and incorporation.** *J. Environ. Qual.* 8(4): 602-607; 1979 (7 references).

The effects of incorporation and wheel-track compaction on runoff losses of herbicides were determined by measuring losses of propachlor (2-chloro- *N*- isopropyl acetanilide), atrazine [2-chloro-4- (ethyl- amino)-6-(isopropylamino) -*s*- triazine], and alachlor [2-chloro-2',6'-diethyl-*N*- (methoxymethyl) acetamilide] in water and sediment from small plots during 122 mm of simulated rainfall. Losses of propachlor, atrazine, and alachlor that were surface-applied to plots without wheel tracks were 3.0, 4.7, and 8.0%, respectively. Corresponding losses from plots where the herbicides were incorporated by disking were only 0.8, 1.6, and 1.7%. Hydrologic differences (more and sooner runoff) caused by wheel tracks on plots where herbicides were surface-applied increased the corresponding losses to 12.7, 18.3, and 22.1%. Although herbicide concentrations were greater in sediment than in water for all treatments, from 82 to 89% of the losses were in solution. (Author abstract by permission)

80-0365. Pahren, H. R.; Lucas, J. B.; Ryan, J. A.; Dotson, G. K. (US EPA, Cincinnati, OH) **Health risks associated with land application of municipal sludge.** *J. Water Pollut. Control Fed.* 51(11): 2588-2601; 1979 (55 references).

The problems associated with the application of municipal sludge to land are discussed. Organic residues of various chemicals may be present in sludge. The substances causing the most concern are PCBs, herbicides, organophosphorus insecticides, and organochlorine insecticides [aldrin, α-BHC, chlordane, DDD (TDE), DDT, *p,p'*-DDE, dieldrin, and oxychlordane]. Many plants growing on the land where the sludge was spread would sorb various organic pesticides through their roots and translocate them within the plant. Animals grazing on land spread with sludge would feed on these plants, and might also ingest sludge directly. One study in which sludge is incorporated into the feed of cattle is mentioned. Muscle and fat samples showed trace levels of hexachlorobenzene, α-BHC, *p,p'*-DDE, dieldrin, PCBs, oxychlordane, and transonachlor. While there is a lack of sufficient information on this particular aspect of sludge spreadability, it is suggested that caution be exerted in applying sludge high in PCBs or similar hazardous organics to land where animls might feed on the plants grown there.

80-0366. Nikolaenko, Zh. I.; Geller, I. A.; Makovetskii, K. A.; Matushkin, S. I. (All-Union Res. Inst. Sugar Beet Growing, USSR) **Deistvie nortrana na mikrofloru pochvy pod sakharnoi svekloi. [Effect of nortran on soil microflora in sugar beet crop.]** *Khim. Sel'sk. Khoz.* 17(7): 36-39; 1979 (Russian).

An attempt was made to evaluate the effect of herbicide nortron (2-ethoxy- 2,3-dihydro- 3,3-dimethyl- 5-benzofuranyl- methansulfonate) on the soil microflora in sugar beet crop. Soil incorporation of nortron applied at rate of 2, 4, and 8 kg/ha resulted in a 1.3-9.2 fold decrease of the number of ammoniafiers, oligonitrophiles, and fungi; the number of denitrofiers showed a more drastic decrease (2-55 fold). The toxicity of nortron applied in a mixture with TCA (2+ kg/ha) was approximately equal to toxicity of nortron alone applied at a rate of 4 kg/ha. It was found that a 50% suspension of nortron caused more marked inhibition of soil microflora than a 20% emulsion.

80-0367. Yoshimura, M.; Sugiyama, S.; Noda, H.; Yamaguchi, M.; Doi, S.; Yamada, T.; Mitsukuni, Y. (Dep. Leg. Med., Fac. Med., Kinki Univ., Osaka, Japan) **[PCB and organochlorine pesticides in human fetal organs and tissues.]** *Kinki Daigaku Igaku Zasshi (Med. J. Kinki Univ.)* 4(2): 209-218; 1979 (15 references) (Japanese).

PCB and organochlorine pesticide residues in organs and tissues of newborns not yet given mother's milk were determined. All residues present represent amounts which were transmitted via the placenta. BHC (lindane) was detected in all specimens of subcutaneous fat and liver at average levels of 8.84 and 4.46 μg/g, respectively. These values corresponded to 99 and 80%, respectively, of BHC found in the mother. DDT was also detected in all specimens of subcutaneous fat and liver at levels of 2.47 and 1.54 μg/g, respectively, as compared to 68 and 36% in the mother. From these results it was concluded that PCB, BHC, and DDT may be translocated to the fetus via the placenta to a greater extent than had been previously presumed.

80-0368. Amico, V.; Impellizzeri, G.; Oriente, G.; Piattelli, M.; Sciuto, S.; Tringali, C. (Inst. Dep. Chim. & Chim. Ind., Univ. Catania, Catania, Italy) **Levels of chlorinated hydrocarbons in marine animals from the central Mediterranean.** *Mar. Pollut. Bull.* 10(10): 282-284; 1979 (4 references).

Anchovies (*Engraulis* spp), stripped millet (*Mullus*), tuna (*Thunnus*), shrimp (*Nephrops*), and Medit-

terranean mussels (*Mytilus*) collected in the Ionian barrier of the Mediterranean Sea were analyzed for organochlorine pesticide content. PCB and DDT (Σ-DDT) concentrations far exceeded all other contaminants; ΣDDT concentrations ranged from 11.3 to 82.7 ppb (fresh weight) in anchovies, 3.9-85.5 ppb in mullets, and were lowest in shrimp (1.2-4.4 ppb). ΣBHC concentrations in all specimens ranged from 0.1 to 5.0 ppb. HCB (hexachlorobenzene), aldrin, and dieldrin concentrations rarely exceeded 1.0 ppb in any of the 5 species. The concentrations of chlorinated compounds found in these marine animals are about two orders of magnitude below standards regarded to present a hazard as human food.

80-0369. Contardi, V.; Capelli, R.; Pellacani, T.; Zanicchi, G. (Inst. Chim. Gen., Gruppo Ricerca Oceonol. Univ. Genova, Genoa, Italy) **PCBs and chlorinated pesticides in organisms from the Ligurian Sea.** *Mar. Poll. Bull.* 10(10): 307-311; 1979 (17 references).

The concentrations of chlorinated pesticides and PCBs in 6 marine species of differing feeding habits and habitats were determined. α- and γ-BHC concentrations were very low in all organisms (0.22-3.20 ppb) with the exception of a value of 8.10 ppb for *Sarda sarda*. Total DDT concentrations ranged from 1.7 ppb in *Nephrops* sp. to 121.4 ppb in *Mullus barbatus*. PCB concentrations were found to be lowest in *Nephrops* (21-157 ppb), followed by *Mytilus* (93-181 ppb), *Engraulis* (88-225 ppb), and were highest in *Mullus* (188-1486 ppb). Increasing levels of contaminants due to all chlorinated agents were found in the order of *Nephrops, Mytilus, Engraulis, Mullus, Euthymnus,* and *Sarda*.

80-0370. Smokler, P. E.; Young, D. R.; Gard, K. L. (Dep. Environ. Sci. & Eng., Univ. California, Los Angeles, CA 90024) **DDTs in marine fishes following termination of dominant** California **input: 1970-77.** *Mar. Poll. Bull.* 10(11): 331-334; 1979 (11 references).

DDT residue concentrations in 3 marine fish species with distinctly different feeding habits were measured between 1970-1977. Total DDT residues in kelp bass tissues decreased from 3-8 mg/kg to 0.8-0.9 mg/kg over the same period of time. This 4 and 8-fold decrease, respectively, over a 7-yr period corresponds to a dramatic reduction (by a factor of 30) of annual DDT emissions from the Los Angeles County Sanitation District. There was no apparent decrease, however, in pesticide concentrations in the sediment-feeding Dover sole, indicating that the sediment is a likely source of persistent contamination of fishes in the area.

80-0371. Harms U.; Drescher, H. E.; Huschenbeth, E. (Isotopenlab., Bundesdorschungsanst. Fisch., Hamburg, BRD) **Further data on heavy metals and organochlorines in marine mammals from German coastal waters.** *Meeresforschung* 26(3-4): 153-161; 1978 (26 references).

The residue levels of chlorinated hydrocarbons and heavy metals in marine mammals collected from the North and Baltic Seas were investigated. Tissue samples were taken from 70 harbor seals (*Phoca vitulina*), 1 ringed seal (*Phoca hispida*), 1 grey seal (*Halichoerus grypus*), 3 harbor porpoises (*Phocoena phocoena*), 1 bottlenose whale (*Hyperoodon ampullatus*) and 1 white whale (*Delphinapterus leucas*). Results showed that Zn and Cu levels in mammals showed no increase over those reported earlier for fish from the same waters. Cd and Pb also showed little variance across trophic levels. Hg was found to bioaccumulate in the liver of mammals, and in the case of harbor porpoises, hepatic Hg levels increased with the size of the animal. Harbor seals also showed increased levels of Hg in the liver with age. Maximum DDT levels found in seal blubber were 27.2 ppb, while PCB levels reached levels of 564 ppm. These findings are compared with values reported for the content of whale and porpoise fatty tissues in previous studies done in other locations. TDE, DDE, dieldrin and lindane residues were also detected in the mammal tissues examined. It is suggested that the pesticide burden of the vaious tissues of the species examined is a reflection of their lipid content.

80-0372. Wahid, P. A.; Sethunathan, N. (Lab. Soil Microbiol., Cent. Rice Res. Inst., Cuttack 753006, India) **Involvement of hydrogen sulfide in the degradation of parathion in flooded acid sulfate soil.** *Nature (London)* 282(5737): 401-402; 1979 (10 references).

There is increasing evidence that certain pesticides, resistant to degradation in aerobic systems, undergo fairly rapid degradation in anaerobic ecosystems such as flooded soil. After flooding, the soil components NO_3^-, Fe^{3+}, Mn^{4+} and SO_4^{2-} are reduced almost in a thermodynamic sequence with a corresponding shift in favor of anaerobic microorganisms. Although anaerobic microorganisms have been implicated directly in the degradation of some pesticides in anaerobic environments, there is circumstantial evidence for chemically catalyzed reactions, involving, for example, the iron redox system or reduced iron porphyrins. However, the importance of this and other dominant redox reactions in the behaviour of pesticides in a flooded soil is not well understood. We report here the involvement of hydrogen sulfide, the end product of sulfate reduction, in the degradation of parathion in a flooded acid sulfate soil. (Author abstract by permission)

80-0373. Yoshimura, M.; Sugiyama, S.; Noda, Y.; Yamaguchi, M.; Doi, S.; Yamada, T.; Mitsukuni, Y. (Fac. Med., Kinki Univ., Osaka, Japan) **[Translocation and accumulation of environment polluting chemical substances to the human fetus. Part I. PCB and organochlorine**

pesticides.] *Nippon Hoigaku Zasshi (Jpn. J. Legal Med.)* 33(5): 659; 1979 (Japanese).

Residues of PCBs, BHC isomers, total DDT, dieldrin, and heptachlor epoxide were determined in organ tissues of several deceased infants. The infants had not been breast-fed prior to death and it was concluded that the residues present were the result of placental transfer. The data were compared to pesticide levels in the maternal body. Amounts of BHC, DDT, and dieldrin plus heptachlor epoxide from the subcutaneous fats and liver samples are presented in graph form. In some cases the concentrations in tissues were higher in the infant than in the mother. The authors concluded that unusually large amounts of organochlorine pesticide residues had been accumulated in the fetal body.

80-0374. Barnett, R. W.; D'Ercole, J.; Cain, J. D.; Arthur, R. D. (Epidemiol. Stud. Prog., Mississippi State Chem. Lab., Mississippi State, MS 39762) **Organochlorine pesticide residues in human milk samples from women living in northwest and northeast Mississippi, 1973-75.** *Pestic. Monit. J.* 13(2): 47-51; 1979 (17 references).

Organochlorine pesticide analyses were performed on human milk samples obtained from 34 women living in the Mississippi delta, a high pesticide usage area, and from 6 women living in Starkville, Mississippi, a low pesticide usage area. Nine women samples collected before and after their babies had nursed so that fat levels and ΣDDT levels could be compared on whole milk and milk fat bases. ΣDDT values were independent of collection time if calculated on a milk fat basis, but not if calculated on a whole milk basis. Thus the most consistent indicator of DDT residues were values calculated on a milk fat basis. Residue levels for *p,p'*-DDE, *p,p'*-DDT, and ΣDDT were significantly different ($P < 0.01$) in samples from the 2 areas. Residues of *o,p'*-DDT, β-BHC, and oxychlordane in milk samples from women living in the high pesticide usage area also were significantly different ($P < 0.05$). A mean value of 19.17 ppm ΣDDT, found in the milk fat of samples from the high pesticide usage area, is the highest ever reported. Samples from the low pesticide usage area contained a mean level of 2.36 ppm ΣDDT. (Author abstract by permission)

80-0375. Currie, R. A.; Kadis, V. W.; Breitkreitz, W. E.; Cunningham, G. B.; Bruns, G. W. (Food Lab. Serv. Branch, Alberta Agric., Edmonton, Alberta T6H 4P2, Canada) **Pesticide residues in human milk, Alberta, Canada - 1966-70, 1977-78.** *Pestic. Monit. J.* 13(2): 52-55; 1979 (9 references).

Organochlorine pesticide residues were determined in human milk of residents of Alberta, Canada, during 1966-70 and 1977-78. Levels of polybrominated biphenyls (PBBs), polychlorinated biphenyls (PCBs), and some common organophosphorus pesticides were also monitored during 1977-78. Average residue levels were generally lower in 1977-78 samples, whereas the percent incidence of residues was generally lower in 1966-70 samples. β-BHC was found in all 1977-78 samples, but was not detected in 1966-70 samples. PCBs were detected in all but 2 of the 1977-78 samples. Average levels of *p,p'*-DDT and its metabolites were substantially lower during the second period than during the first. Large increases in the average levels and percent incidences of heptachlor epoxide and *o,p'*-DDT have been attributed to refinements in both cleanup and gas chromatographic analysis. Although no PBBs or organophosphorus pesticides were detected in 1977-78 samples, an unidentified hydrocarbon similar to dicofol was found in all samples of that period. No correlation between donor age groups and average pesticide residue levels could be inferred. (Author abstract by permission)

80-0376. Blus, L. J.; Lamont, T. G. (Pacific Northwest Field Stn., Corvallis, OR 97330) **Organochlorine residues in six species of estuarine birds, South Carolina, 1971-75.** *Pestic. Monit. J.* 13(2): 56-60; 1979 (21 references).

In South Carolina between 1971 and 1975, authors evaluated the occurrence of organochlorine residues in the laughing gull (*Larus atricilla*), white ibis (*Eudocimus albus*), glossy ibis (*Plegadis falcinellus*), American oystercatcher (*Haematopus palliatus*), willet (*Catoptrophorus semipalmatus*), and ruddy turnstone (*Arenaria interpres*). Tissues of birds found dead and eggs were analyzed, eggshell thicknesses were measured, and incidental observations were made of reproductive success and population status. Eggshell thicknesses of the white ibis, American oystercatcher, and laughing gull were not significantly different ($P < 0.05$) from the pre-1947 norms. DDE and polychlorinated biphenyls (PCBs) were found most frequently and at the highest concentrations in eggs. DDE residues declined significantly in oystercatcher eggs, and declined slightly in laughing gull eggs; no change was noted in white ibis eggs. No consistent trends were found for dieldrin and PCBs. Authors found no obvious problems with reproductive success of any species. Populations of the 5 species breeding in South Carolina appear stable. The white ibis and laughing gull in South Carolina have experienced population explosions over the past 50 years; the glossy ibis has increased substantially since the first documented breeding records in 1947. (Author abstract by permission)

80-0377. Pearce, P. A.; Peakall, D. B.; Reynolds, L. m. (Canadian Wildl. Serv., Dep. Environ., Fredericton, New Brunswick E3B 4Z9, Canada) **Shell thinning and residues of organochlorines and mercury in seabird eggs, Eastern Canada, 1970-76.** *Pestic. Monit. J.* 13(2): 61-68; 1979 (35 references).

Organochlorine and mercury concentration are

reported for 252 eggs of Leach's storm-petrel (*Oceanodroma leucorhoa*), double-crested cormorant (*Phalacrocorax auritus*), common eider (*Somateria mollissima*), common tern (*Sterna hirundo*), razorbill (*Alca torda*), common murre (*Uria aalge*), black guillemot (*Cepphus grylle*), and Atlantic puffin (*Fratercula arctica*) from the Bay of Fundy, the Gulf of St. Lawrence, and the open Atlantic shore of Canada during 1970-76. Concentrations of all organochlorines except DDE and polychlorinated biphenyls (PCBs) were low. DDE, PCBs, and mercury residues were highest in cormorant and petrel, intermediate in alcids, and lowest in eider and tern. Temporal and spatial aspects of contamination patterns are discussed. Authors conclude that only in cormorants were DDE residues high enough to cause, through eggshell thinning, local population declines. (Author abstract by permission)

80-0378. Wang, T. C.; Krivan, J. P., Jr.; Johnson, R. S. (Harbor Branch Found. Inc., Fort Pierce, FL 33450) **Residues of polychlorinated biphenyls and DDT in water and sediment of the St. Lucie Estuary, Florida, 1977.** *Pestic. Monit. J.* 13(2): 69-71; 1979 (14 references).

Σ-DDT residues in the St. Lucie River bottom sediments increased after Lake Okeechobee water was discharged through the St. Lucie Canal into the area. Σ-DDT levels were highest in sediment samples from the Palm City area, ranging from 1.8 ppb to 6.15 ppb. Sediment samples from the AIA Highway Bridge area contained 1.6-6.8 ppb Aroclor 1254. Levels of polychlorinated biphenyls (PCBs) and ΣDDT in sediment samples from the junction of the St. Lucie and Indian Rivers were not detectable. Surface water samples from the estuary did not show any detectable DDT or PCB residues. (Author abstract by permission)

80-0379. Lyman, W. R.; Anderson, R. J. (Agric. Prod. Res., Rohm & Haas Co., Spring House, PA 19477) **Dicofol residues in United States soils having a known history of its use as a miticide, 1974.** *Pestic. Monit. J.* 13(2): 72-74; 1979 (10 references).

Soil samples were collected from a total of 21 sites in California, Washington, Florida, Pennsylvania, and Michigan. Dicofol (Kelthane) miticide had been applied at various times over a 5-year period to 17 of the sites; 4 sites had received no applications. Samples were collected at 0-75 mm and 75-150 mm depths, and submitted to gas-liquid chromatographic analysis. Samples from only 4 of the 17 treated sites contained mean residues equal to or exceeding 2.00 ppm. Residues in all cases were only a small fraction of the total amount applied. Apparently, a mechanism for the dissipation of dicofol exists, but it is unidentified at this time. (Author abstract by permission)

80-0380. Cook, G. T.; Duncan, H. J. (Dep. Chem., Univ. Glasgow,Glasgow G12 8QQ, Scotland) **Uptake of aminotriazole from humectant- surfactant combinations and the influence of humidity.** *Pestic. Sci.* 9(6): 535-544; 1978 (22 references).

Uptake of aminotriazole (3-amino-1,2,4- triazole; amitrole) by bean leaves (*Phaseolus vulgaris* var. Canadian Wonder) was not greatly influenced by the addition to the spray solution of dimethylformamide (DMF), ethylene glycol and polypropylene glycol 400 (PPG 400) over the concentration range 1.0-50.0 ml/l. However, the addition of polyoxyethylene 20 sorbitan monolaurate (polysorbate 20) (0.2-1.0 g/l) to spray solutions of the above additives and glycerol (5.0 ml/l; except for DMF, 50.0 ml substantially increased uptake to 80-100% in all cases at 50 ± 10% relative humidity (rh). Similar penetration figures were recorded when a range of polysorbate surfactants (polysorbate 20, 40, 60, 80 and 85; 0.2 g/l) were applied to spray solutions containing either dimethyl sulfoxide (DMSO) or glycerol (5.0 mg/l). Humidity was found to have a critical effect upon the humectant- surfactant combinations tested, DMSO + polysorbate 20, ethylene glycol + polysorbate 20, and PPG + 400-polysorbate 20, (5.0 ml/l + 0.2 g/l). With DMSO + polysorbate 20 the following uptake figures were recorded: < 30% rh, 3.1%; 45 ± 10% rh, 86.8%; 55-65% rh, 48.2%; and 100% rh, 0.3%. Similar trends were recorded with all 3 humectant- surfactant combinations. Further studies revealed that the adverse effect of humidity on DMSO + polysorbate mixtures could be at least overcome partially by regulating the DMSO concentration. (Author abstract by permission)

80-0381. Rouchaud, J.; Moons, C.; Meyer, J. A. (Lab. Phytopathol., Univ. Cathol. Louvain, B-1348 Louvain-la-Neuve, Belgium) **Characterization of bound residues of ^{3}H triforine in the straw of barley grown in the field.** *Pestic. Sci.* 10(5): 438-446; 1979 (11 references).

Barley was grown in an experimental field and, at the growth stage *J* (during the stem extension stage when the second node of the stem was formed and the next-to-last leaf just visible), the aerial parts of the plants were sprayed with an aqueous emulsion of a mixture of triforine and [^{3}H]triforine (uniformly labelled in the piperazine ring) at the recommended rate of 250 g triforine/ha. Barley was harvested when ripe, and the straw was analyzed separately. Extraction of the straw with methanol left methanol-insoluble solids containing an amount of radioactivity (the bound residue) which represented 88% of the tritium (as with all the subsequently quoted percentages, relative to the total tritium incorporated into the straw). Methanol acidified with hydrochloric acid extracted a further 8% of the triforine-derived bound residues as radioactive iminodiacetic acid (0.4%), glycine (3.2%), serine (2.0%), ethanolamine (0.2%) and unidentified compounds (2.2%); a neutral detergent solution extracted a further 3% of the radioactive triforine-derived bound residues as unidentified compounds; these radioactive compounds, which were

dissolved by the acidified methanol and by the neutral detergent solution, were thus complexed in the straw to straw constituents. An acid detergent solution extracted a further 58% of the total tritium, which was incorporated by means of chemical bonds into the hemicelluloses fraction. Acid hydrolysis of the hemicelluloses yielded a mixture of monosaccharides; these were converted into a mixture of osazones (50%), recrystallized several times, and had a constant specific radioactivity, indicating that the monosaccharides were tritiated. The plant solids (which contained 19% of the total tritium), left by the acid-detergent extraction, were processed and separated into the tritium-containing cellulose (13%) and lignin (6%) fractions. No piperazine was observed in the bound residue of straw. Biochemical pathways are suggested for the radioactive metabolites of [^{3}H]triforine. (Author abstract by permission)

80-0382. Juneja, S.; Dogra, R. C. (Dep. Microbiol., Haryana Agric. Univ., Hissar, India) **Biodegradation of aldrin and lindane by rhizobia.** *Pesticides* 12(7): 34-35; 1978 (1 reference).

The biodegradation of lindane and aldrin by 2 species of rhizobium was studied in semi-synthetic medium for 6 wk. The amount of chloride released in the supernatant of the medium after centrifugation was determined colorimetrically and taken as an index of organochlorine insecticide degradation. For *Cicer* rhizobium, about 10 μg/ml chloride were released after 2 wk for both compounds and nearly 30 μg/ml chloride were released after 3 wk. For *Phaseolus* rhizobium less than 10 μg/ml chloride were released by both compounds by the 2nd wk and less than 30 μg/ml chloride were released by the 3rd wk. After the 3rd wk, aldrin and lindane degradation by both organisms was considerably less.

80-0383. Wessels, C. L. (Plant Prot. Res. Inst., Dep. Res. & Spec. Serv., Minist. Agric., Causeway, Salisbury, Rhodesia) **Residues in soybean plants (*Glycine max* (L.) Merr.) of aldrin and dieldrin following soil application and of endosulfan and DDT following foliar application.** *Rhod. J. Agric. Res.* 16(2): 205-210; 1978 (4 references).

Tests were designed to determine residue levels of some chlorinated hydrocarbons in parts of soybean plants at harvest after being grown under Rhodesian growing conditions. Plots were treated with soil applications of 5 or 10 kg AI/ha aldrin or 2.5 or 10 kg AI/ha dieldrin, with a control plot left untreated. Two foliar sprays of endosulfan (1[illegible].5 g AI/ha) were applied to these fields 71 and 50 days before harvest, and other plots received 3 foliar applications of 1 kg DDT AI/ha 97, 74 and 50 days before harvest. Soil samples were collected before treatment and again at harvest, and 25 plants were collected from each plot and divided into roots, stems and leaves, pods, and beans. Soil and plant extracts were analyzed by gas-liquid chromatography using a ^{63}Ni electron capture detector. Aldrin and dieldrin levels were low in beans, but high in roots, and indicated a concentration effect by the roots. Endosulfan levels were 0.14-0.2 mg/kg in the beans and 0.6-1.06 mg/kg in the pods, but no other plant parts were contaminated. Total DDT levels in beans were < 0.1 mg/kg, but other plant parts were noticeably contaminated. It is suggested that since the stems plus leaves contain the greatest DDT residue (16.25 mg/kg), soybean hay should not be used as stock feed.

80-0384. Leistra, M. (Lab. Res. Insectic., NL-6709 PG Wageningen, The Netherlands) **Computing the movement of ethoprophos in soil after application in spring.** *Soil Sci.* 128(5): 303-311; 1979 (20 references).

Computations are given to describe the movement of the insecticide- nematicide, ethoprophos (ethoprop) in soil under varying patterns of rainfall and evaporation. Four soils common in The Netherlands (sandy loam, loam, humic sand, and peaty sand) were used to test the adsorption of ethoprophos. Two representative values of the adsorption coefficient for each of the 4 soils were incorporated into the computations. A significant penetration of the pesticide below the incorporation depth (0.10 m) was computed in only the sandy loam soil. Redistribution values for ethoprophos were calculated to be much smaller in the humic sand. Other simulated experiments suggested convective dispersion as the main route of pesticide movement with little volatilization occurring. It was recommended that, in the spring under normal rainfall conditions, ethoprophos be incorporated into the plough layer to prevent damage to the root systems of the crop.

80-0385. Schrimpff, E.; Thomas, W.; Herrmann, R. (Lehrstuhl Hydrol., Univ. Bayreuth, D-8580 Bayreuth, BRD) **Regional patterns of contaminants (PAH, pesticides and trace metals) in snow of northeast Bavaria and their relationship to human influence and orographic effects.** *Water Air Soil Pollut.* 11(4): 481-497; 1979 (22 references).

Samples (2 *l*) were taken from newly fallen snow in northeastern Bavaria, extracted with 3 successive additions of 20 ml petrol ether and concentrated by rotary evaporation without prior cleaning or drying. The pesticides α-BHC, γ-BHC (lindane), aldrin and dieldrin were then determined using gas chromatographic methods. While specific trends of contamination were perceived in similar examinations for trace metals and PAHs, no such distinct pattern was revealed from the examination of the snow for pesticide concentrations. Relatively higher concentrations of pesticide residues were noted in the southern and western parts of the metropolitan area of Nurnberg. Some areas of locally high concentrations were noted for dieldrin and for γ-BHC. It appears that the pesticide contamination originates from diffuse sources in agricultural and forested lands.

See also 80-0307, 80-0308, 80-0311, 80-0312, 80-0318, 80-0321, 80-0323, 80-0325, 80-0405, 80-0406, 80-0419, 80-0423, 80-0478, 80-0488, 80-0510 *and* 80-0528.

80-0386. Ullmann, L.; Phillips, J.; Sachsse, K. (Ciba-Geigy Ltd., Basle, Switzerland) **Cholinesterase surveillance of aerial applicators and allied workers in the Democratic Republic of the Sudan.** *Arch. Environ. Contam. Toxicol.* 8(6): 703-712; 1979 (14 references).

During the seasonal aerial application of insecticides on cotton, a cholinesterase surveillance program was realized and the adherence of the safety measures in connection with insecticides was supervised. No cases of ill health or poisoning due to the handling of the insecticides are known to have occurred among pilots, entomologists, or aircraft engineers. Only a small number of ground personnel and landing strip workmen showed temporarily depressed cholinesterase levels while engaged in this program. (Author abstract by permission)

80-0387. Mabuchi, K. (Dep. Epidemiol. & Prev. Med., Univ. Maryland Sch. Med., Baltimore, MD) **Lung cancer among pesticide workers exposed to inorganic arsenicals.** *Arch. Environ. Health* 34(5): 312-320; 1979 (19 references).

Cancer mortality was studied in 1,393 persons exposed to high air concentrations of inorganic arsenicals for varying lengths of time during the manufacture and packaging of pesticides at a plant in Baltimore, Maryland. Employees consisting of 1,050 males and 343 females were traced for the period 1946 to 1977, and vital status was determined for 86.9% of males and 66.8% of females. The observed number of deaths from all and selected causes was compared with the number expected from the Baltimore City mortality experience in terms of the Standardized Mortality Ratio (SMR). A significantly increased SMR for lung cancer was especially high in males with presumed high exposure to arsenicals. A dose-response relationship was suggested by the SMR for lung cancer which increased with increasing duration of exposure to arsenicals, but no such relationship was evident for nonarsenicals. Although smoking habits could not be examined in the study subjects, the authors believe that the findings provide additional epidemiologic evidence on the respiratory carcinogenicity of occupational exposure to airborne inorganic arsenicals. (Author abstract by permission)

80-0388. Sullivan, W. N.; Cawley, B. M.; Schechter, M. S.; Morgan, N. W.; Pal, R.* (Chem. & Biophys. Control Lab., Agric. Environ. Qual. Inst., Fed. Res., Sci. & Educ. Adm., USDA, Beltsville, MD 20705) **Aircraft disinsecting: the effectiveness of freon-based and water-based phenothrin and permethrin aerosols.** *Bull. WHO* 57(4): 619-623; 1979 (5 references).

In Miami, Florida, USA, passenger compartments of jet aircraft were disinsected during the taxiing period prior to take off. An application of a 20 g/l Freon-based or water-based permethrin formulation at 35 mg of aerosol/100 m^3 was 100% effective against caged mosquitos and flies. The flammability hazard of the sprays from water-based hydrocarbon aerosols was evaluated. (Author abstract by permission)

80-0389. Harrington, J. M. (London Sch. Hyg. & Occupat. Med., London WC1E 7HT, England) **Safety and chemicals in the environment: effects and epidemiology.** *Chem. Ind. (London)* (21): 722-728; 1979 (18 references).

A review is presented in which various aspects of the effects and epidemiology of chemicals in the environment are discussed. Epidemiology is defined and its uses outlined. The main use of epidemiology is the identification and control of hazards that affect the health of a population. The ultimate goal of an epidemiological study on a hazard is to obtain accurate information about the object of the study. Specific examples are cited where epidemiological methods are used. A case of intoxication among residents of Chattanooga exposed to chlordane contaminated drinking water and an incident of occupational exposure to Kepone (chlordecone) are described. Other hazards in drinking water, food, and occupational and environmental associations are included. It is concluded that the epidemiological study is a deductive process of evaluating hazards, but it cannot prove causes and effects.

80-0390. Anonymous **Union seeks ban on Eli Lilly herbicide.** *Chem. Week* 125(20): 28; 1979.

The International Chemical Workers Union (ICWU) has petitioned the US EPA and OSHA to ban the production and use of the herbicide oryzalin, registered by Eli Lilly and Co. The union claims that no normal pregnancies occurred among union members' families during the time oryzalin was produced. Five cases of heart defects, including transpositioned heart vessels, were reported in infant children of workers exposed to the product. Thirty cases of severe dermatitis were also reported in workers at a Michigan plant where oryzalin is currently produced. Eli Lilly's toxicological data gives no indication that pure oryzalin is a factor in birth defects.

80-0391. Comstock, E. G. (1802 Med. Towers, Houston, TX 77030) **The practice of medical toxicology.** *Clin. Toxicol.* 15(1): 1-11; 1979 (3 references).

Two hundred twelve consecutive cases presented to a medical toxicologist related to chronic occupational exposure (49%), acute occupational exposure (24%), and nonoccupational exposure (27%). Chief complaints were respiratory (36%), behavioral (28%), neuropathy (17%) and organic brain syndrome (10%). Ten percent of all cases were caused by pesticides. In 90% of patients, litigation was in process or under consideration. Referrals were from plaintiff attorneys (37%), from employers, insurance com-

panies, and defense attorneys (26%), and from physicians (24%). Outcome of assessment revealed 55% to be unrelated to toxic substances, 39% probably related, and 6% positively related. (Author abstract by permission)

80-0392. Morse, D. L.; Baker, E. L., Jr.; Kimbrough, R. D.; Wisseman, C. L. (Univ. Rochester Med. Cent., Rochester, NY 14602) **Propanil- chloracne and methomyl toxicity in workers of a pesticide manufacturing plant.** *Clin. Toxicol.* 15(1): 13-21; 1979 (10 references).

In a survey of occupationally acquired disease in workers at a pesticide plant, we found that 11 (11%) of 102 workers had been hospitalized for illness related to chemical exposures; highest hospitalization rates occurred in packaging (27%), production (22%), and maintenance (9%) workers. The most common causes of hospitalization were intoxication by the carbamate pesticide methomyl [1-(methylthio) ethylidene amino methyl carbamate], a reversible cholinesterase inhibitor, and met hemoglobinemia following exposure to 3,4-dichloroaniline. On clinical evaluation, 5 (46%) of 11 packaging workers, the group with the highest exposure to methomyl, had experienced blurred vision or pupillary constriction. Seventeen (61%) of 28 production workers with exposure to dichloroaniline and propanil (3′,4′- dichloro propionanilide) had chloracne, and and acne-form dermatosis caused by the contaminant tetrachlor azobenzene in propanil and dichloroaniline. The chloracnegenic potentials of propanil and dichloroaniline were verified by rabbit ear tests. These findings reemphasize the hazards inherent in the manufacture and formulation of pesticides and herbicides. (Author abstract by permission)

80-0393. Stoke, J. C. J. (Dep. Health, Wellington, New Zealand) **Captofol dermatitis in the timber industry.** *Contact Derm.* 5(5): 284-292; 1979 (3 references).

Fourteen plants where captafol was used for treatment of timber were selected for study. In each plant an inspection was made of the method of use of captafol, a review of the hygiene procedures in force, and a personal health evaluation. The provision of protective clothing varied considerably from plant to plant. Facilities for washing were always available. Each plant had a separate eating area, and all workers exposed to captafol were seen and examined when possible. In 5 plants no captafol dermatitis was noted, while in 6 plants, reactions occurred in at least 33% of the workers. Symptoms appeared from 1 day to 2 wk after exposure. The most common initial sites of reaction were the forearms, hands, or around the eyes. The length of time of resolution varied from 2 days to 3 wk. The washing habits of the workmen did not seem to be an important part of whether they reacted to the chemical or not. It is noted that the knowledge the workers had of the dangers in the chemical was greater among those who did not experience problems than among those who did.

80-0394. Ubaidullaev, R.; Khasanov, T. S. (Uzbek Sci. Res. Inst. Sanit. Hyg. & Occup. Diss., Tashkent, USSR) **Gigienicheskoe normirovanie geksaklorana, fozalona i butifosa v atmosfernom vozdukhe pri posledovatel'nom primenenii ikh v sel'skom khozyaistve. [Hygienic standards for hexachloran, fozalone, and butyphos in the air when these pesticides are used sequentially in agriculture.]** *Gig. Sanit.* 44(9): 14-17; 1979 (3 references) (Russian).

It was experimentally determined that when hexachloran (BHC), fozalone (phosalone), and butyphos (DEF) are present sequentially in the ambient air, the average daily maximum allowable concentration should be set at 0.05, 0.01, and 0.01 mg/m^3, respectively. These are the average daily maximum allowable concentrations established separately for these substances.

80-0395. Okamoto, H.; Horio, T. (Dep. Dermatol., Fac. Med., Kyoto Univ., Kyoto, Japan) **[Contact dermatitis due to bithionol.]** *Hifuka Kiyo (Acta Derm. Kyoto)* 74(1-2): 57-60; 1979 (16 references) (Japanese).

A case of bithionol (lorothiodol) induced photodermatitis is discussed. The clinical course of the disease, including persistent photosensitivity, may be due to persistence of the fungicide on the skin for extended periods. Since this chemical is readily available and is widely used, patients suspected of photocontact dermatitis should undergo photopatch testing with bithionol.

80-0396. McMillan, R. (Dep. Clin. Res., Scripps Clin. & Res. Found., La Jolla, CA) **Environmental thrombocytopenic pupura.** *J. Am. Med. Assoc.* 242(22): 2434-2435; 1979 (9 references).

A case history of a 67-year-old female with chronic immune thrombocytopenic purpura, characterized by malaise, weakness, nausea, vomiting and diarrhea is presented. The platelet count was 20,000/cu mm. When the patient left the San Diego area for a visit to New York City, the platelet count improved, only to decrease when she returned to San Diego. After a subsequent move to New York, followed by moves to Ann Arbor and San Francisco, her platelet count rose to normal and remained so. The possibility of a spontaneous remission is mentioned, but is considered unlikely. It is suggested that this case provides strong evidence for the presence of an environmental etiologic agent. Thrombocytopenia has been reported to be caused by such environmental agents as chlorophenothane (DDT), toluene, turpentine, and certain foods.

80-0397. Wang, H. H.; MacMahon, B. (Dep. Epidemiol. Harvard Sch. Public Health, Boston, MA 02115) **Mortality of pesticide applicators.** *J. Occup. Med.* 21(11): 741-744; 1979 (12 references).

A mortality study on professional pesticide ap-

plicators is described. A cohort consisting of 16,126 males employed for 3 months or more between 1967 and 1976 by 1 of 3 nationwide pest control companies was chosen, and will be followed prospectively. Results on retrospective observations are presented in this paper. It was ascertained that 311 deaths occurred between 1967 and 1976, giving a standardized mortality ratio (SMR) of 84. SMRs were over 100 for 3 causes of death: cancer of the lung (115), cancer of the skin (173) and cancer of the bladder (277). The ratios were not significantly different from those expected for cancers of the lung and skin, and the excess in bladder cancer was of borderline significance. There was no excess in deaths from lung cancer among termite control operators, who are likely to be exposed to chlordane and heptachlor. SMRs were significantly low for cancer of the digestive organs and for diseases of the digestive and respiratory systems. In comparison with data from pesticide manufacturers, there was no consistent pattern of excess mortality. It is pointed out that the present study is limited by the fact that there are relatively few workers who had substantial work experience and who were followed for long periods of time.

80-0398. Wang, H.H.; MacMahon, B. (Dep. Epidemiol., Harvard Sch. Public Health, Boston, MA 02115) **Mortality of workers employed in the manufacture of chlordane and heptachlor.** *J. Occup. Med.* 21(11): 745-748; 1979 (13 references).

A retrospective mortality study on workers employed in the manufacture of chlordane and heptachlor between 1946 and 1976 is described. The cohort consisted of 1,403 white males who were employed for more than 3 mo at 1 of 2 plants. Standard mortality ratios (SMRs) were calculated by dividing the observed deaths by the expected and multiplying by 100. There were 113 deaths in the group compared to 157 expected, giving an SMR of 72. There was no overall excess of deaths from cancer, even in workers followed for more than 20 yr after entry into the occupation. There were fewer deaths than expected due to diseases of the circulatory system as a whole, but there was a significant excess of deaths from cerebrovascular disease. It is pointed out that the small study population and the short follow-up period do not make it possible to state that there is no excess risk of cancer associated with exposure in humans.

80-0399. Whorton, M. D.; Milby, T. H.; Stubbs, H. A.; Avashia, B. H.; Hull, E. Q. (Environ. Health Assoc. Inc., Berkeley, CA 94704) **Testicular function among carbaryl-exposed employees.** *J. Toxicol. Environ. Health* 5(5): 929-941; 1979 (28 references).

A group of 101 employees exposed to carbaryl was examined. The group consisted of 53 baggers, 24 operators, and 24 employees in supervision, maintenance, and other areas. Of the 101 men, 47 produced semen samples satisfactory for analysis and of these 47, 36 provided blood for hormone assay. No relationship could be established between sperm count and exposure category or years worked in classifications based on carbaryl exposure. No relation was noted between the fathering of children and carbaryl exposure. No differences were noted that could be related to carbaryl exposure when sperm counts among the exposed population were compared with those among the non-exposed group.

80-0400. Parshutin, S. M. (All-Union Res. Inst. Chem. Plant Prot., Leningrad, USSR) **Fenazon (60% smachivaiushchiisia poroshok). [Phenazon (60% wettable powder).]** *Khim. Sel'sk. Khoz.* 17(7): 47-48; 1979 (Russian).

Properties, effectiveness, timing, doses and methods of application of the systemic herbicide phenazon (chlorazine) (60% wettable powder) are briefly reviewed. The herbicide is effective against annual weeds in beet and clover crops. Although phenazon was noted to have a low toxicity to animals, certain precautions are suggested for use during application and handling.

80-0401. Andreeva, E. I. (All-Union Sci. Res. Inst. Chem. Means Plant Prot., Moscow, USSR) **TMTD - protravitel' semian. [TMTD seed dressing agent.]** *Khim. Sel'sk. Khoz.* 17(9): 22-23; 1979 (Russian).

The specifications of TMTD (thiram) seed dressing agents and recommendations for its use, application, and handling are presented. The LD50 of TMTD is 400 mg/kg in rats and 210 mg/kg in rabbits. It has an irritating effect and a pronounced cumulatative effect. The MAC in work areas is 0.5 mg/m^3. It is recommended for seed dressing at rates of 1-8 kg/ton. When handling TMTD, it is necessary to wear dust-impermeable overalls,rubber boots, goggles, gloves, and respirators. Treated seeds and roots must not be used as food, animal fodder, nor be processed industrially.

80-0402. Voevodin, A. V. (All-Union Inst. Plant Prot. Moscow, USSR) **Osnovnye etapy izucheniya gerbitsidov. [Basic steps of herbicide testing.]** *Khim. Sel'sk. Khoz.* 17(9): 24-27; 1979 (36 references) (Russian).

The basic steps in the testing of herbicides in the USSR are described. The suitability and effectiveness tests are followed by the study of the effects of the herbicide treatment on the biological and biochemical processes taking place in the soil, plants, crops, and water, such as the residue dynamics and persistence in soil, plants, products, and water. It has been established experimentally that herbicides cause a transient modification in the spectrum of the soil microflora, lasting about 1.5-2 mo. Certain herbicides interfere with biochemical processes in the plant

and may cause qualitative changes in the crop. The sodium salt of 2,4-D reduces the DNA, RNA, and DNA-RNA complex levels in spring wheat plants. Simazine was found to stimulate the nucleic acid neosynthesis in pea seeds, but subsequently it reduces the DNA, RNA, and RNAase levels.

80-0403. Sakamoto, Y.; Nakamura, I.; Gaya, S.; Fukagawa, K.; Mori, T.; Ito, N.; Kaneshiro, Y.; Kurashige, Y.; Miyamoto, T.; Yanagihara, T. (Dep. Intern. Med., Yamaguchi Prefect. Cent. Hosp., Yamaguchi, Japan) **[Three cases of paraquat dichloride intoxication.]** *Nippon Naika Gakkai Zasshi (J. Jpn. Soc. Intern. Med.)* 68(11): 1473; 1979 (10 references) (Japanese).

Three cases of paraquat intoxication are discussed. In case number one a 53-yr-old man, 3 days after ingesting paraquat, was admitted with pain in the oral cavity and pharynx. Conspicuous erosion of mucosa of the oral cavity, paraquat in the urine, and a slight disturbance of hepatic and renal function were found. The lungs were not abnormal. He was treated by blood dialysis and administration of steroids. On day 15 of hospitalization an interstitial pneumoniacal image appeared in a chest roentgenogram. The patient died on day 17 due to dyspnea. Case number 2 was a man of 29 who was hospitalized 3 days after taking paraquat. Renal failure was treated with peritoneal perfusion. Dyspnea appeared on the day 5 of hospitalization and the patient died on day 7. Case number 3 was a 29-yr-old who was hospitalized immediately after swallowing 60 ml of 25% paraquat. Jaundice and oliguria were noted. Urinalysis revealed the presence of many urinary casts in the urine residue. In spite of peritoneal perfusion and stomach washing, she died on day 3 of hospitalization. Although conspicuous stagnation in the lungs was observed in cases 2 and 3, the typical image of interstitial pneumonia was not observed. The major cause of death was thought to be the disturbance of liver and kidney functions.

80-0404. Opekar, B.; Hruska, J.; Noskova, H.; Hajek, E. (Reg. Hyg. Stn., CS-37071 Ceske Budejovice, Czechoslovakia) **Sledovani rizika rtuti na vybranych pracovistich jihoceskoho kraje. [Mercury hazard follow-up in selected workplaces in south Bohemia.]** *Prak. Lek.* 31(6-7): 226-230; 1979 (13 references) (Czech).

The present state of mercury contamination in workplaces exposed to the effects of mercury (seed dressing plants, thermoelectric power plants, and dental offices) was compared with conditions 15 to 20 yr earlier. Mercury levels were established using absorption spectrophotometry. Mercury levels were measured in the atmosphere of the workplaces and in the urine, hair, and blood of exposed workers. In thermoelectric power plants and dental offices average atmospheric mercury concentrations were not above maximum permissible concentration (MPC) values. Urine and hair mercury levels, however, were above those of the control group (3X and 12X). Blood mercury concentrations averaged 0.55 μg Hg/100 ml in dental surgery operatives. For workers using the seed dressing Agronal, average atmospheric mercury concentrations were 2.6 times higher than the MPC. Mercury in urine was 26 times and in hair 306 times higher than the concentrations found in controls. Examined at-risk workers showed no positive clinical signs and expressed no subjective complaints.

80-0405. Janicek, J.; Gajduskova, V.; Cvak, Z. (State Vet. Adm., CS-11006 Prague 1, Czechoslovakia) **Rezidua pesticidnich latek v potravinach. [Pesticides residues in foods.]** *Veterinarstvi* 28(9): 407-8; 1979 (Czech).

The interdisciplinary nature of determining the effects of pesticide residues in foods is discussed. Czechoslovak legislation dealing with certification procedures to determine the hygienic and toxicological effects of pesticide use are reviewed. Fodder contamination with DDT, detection methods of chlorinated pesticides in milk, and results of tests for DDT and BHC performed on samples of fresh and dried milk, cheese, fodder and feed straw are examined. A multi-detection method of organophosphorus insecticides, the comprehensive control system of pesticide application for crop control worked out for Czechoslovakian agriculture in 1975, and daily acceptable intake levels of pesticide residues in foods set by WHO and FAO are also considered.

80-0406. Matyas, Z.; Gajduskova, V. (VUVL, Brno, Czechoslovakia) **Ochrana zdravotni nezavadnosti mleka pred nezadoucimi rezidui insekticidu. [Maintaining the safety level of milk with regard to undesirable insecticide residues.]** *Veterinarstvi* 28(11): 518-519; 1978 (Czech).

The protection of milk from contamination with pesticide residues is discussed. A table listing chlorinated, organophosphorus and carbamate insecticides, their respective oral and percutaneous toxicities, the uses they are certified for (application to soil, feed crops, pastureland, barns, milk cows, or lactating cows) is given. The protective measures to be observed to insure milk safety and precautions to be taken in the handling and application of pesticides, including preventive measures, are specified.

See also 80-0304, 80-0305, 80-0307, 80-0308, 80-0312, 80-0319, 80-0320, 80-0321, 80-0448, 80-0478, 80-0510 *and* 80-0511.

80-0407. Lakota, S.; Raszka, A.; Kupczak, I.; Hlond, S.; Stefan, J.; Roszkowski, J. (Inst. Org. Ind., PL-43200 Pszczyna, Poland) **The effect of methoxychlor and propoxur on the health of carp fry (*Cyprinus carpio* L.).** *Acta Hydrobiol.* 20(3): 197-205; 1978 (21 references).

Studies were performed to determine the effects of methoxychlor and propoxur on carp fry. Six mo old fry were exposed to 0.025 mg AI methoxychlor and 1.0 mg AI propoxur. Static (solutions not renewed) and semi continuous-flow (solutions renewed routinely) tests were performed. After 30 days, controls, experimental fish, and the water from all tanks were analyzed for the pesticides. None of the experimental fish showed an adverse reaction to the pesticides, with the exception of a slightly increased level of mucous secretions. Upon histopathological examination, fry in the semicontinuous methoxychlor test showed damage to gills, and in some cases to the hepatopancreas. In the static tests, fish showed some swelling of the gills, loss of gill epithelium and stagnation hyperaemia of the hepatopancreas. Static tests resulted in 0.06 ppm methoxychlor in muscle and 1.8 ppm in muscle in the semicontinuous tests. Propoxur for the same tissue was 0.02 and 0.49 ppm for static and semicontinuous, respectively. Hepatopancreas showed 0.15 and 3.68 ppm for methoxychlor static and semicontinuous, respectively. Propoxur in the same tissues was 0.59 and 0.65 ppm, respectively, for the static and semicontinuous. Kidneys had 0.07 and 14.14 ppm methoxychlor and propoxur had 0.82 and 0.56 ppm for static and semicontinuous.

80-0408. Kodama, O.; Yamada, H.; Akatsuka, T. (Lab. Agric. Chem., Fac. Agric., Ibaraki Univ., Ami-machi, Inashiki-gun, Ibaraki 300-03, Japan) **Kitazin P, inhibitor of phosphatidyl choline biosynthesis in *Pyricularia oryzae*.** *Agric. Biol. Chem.* 43(8): 1719-1725; 1979 (42 references).

The effect of organophosphorus fungicide, Kitazin P (IBP, *S*-benzyl diisopropyl phosphoro thiolate), on lipid biosynthesis of *Pyricularia oryzae* was investigated. Addition of IBP to the mycelial cells suspension of *P. oryzae* induced a striking decrease in incorporation of methione-methyl ^{14}C, *S*- adenosyl methionine- methyl-^{14}C, and glycerol-1 ^{14}C into phosphatidyl choline, which is the most abundant phospholipid in *P. oryzae*, but incorporation of choline- methyl^{14}C into phosphatidyl choline and that of methionine- methyl ^{14}C into simple lipids were not affected. Incorporation of methionine- methyl-^{14}C into phosphatidyl choline is found to be directly proportional to mycelial cells growth of *P. oryzae*. Enzymes responsible for the biosynthesis from glycerol to phosphatidyl choline through Greenberg's pathway, except phospholipid *N*-methyltransferase, were not inhibited by IBP. IBP concentration required for 50% inhibition of phospholipid *N*-methyltransferase was 40 ppm. IBP had no effect on activities of glycerokinase, glycerophosphate acyltransferase, phosphatidic acid cytidyltransferase, phosphatidyl serine synthetase, and phosphatidyl serine decarboxylase, respectively. Therefore, the specific inhibition of conversion from phosphatidyl ethanolamine to phosphatidyl choline by the transmethylation of *S*- adenosyl methionine might be regarded as one of the modes of action of IBP. (Author abstract by permission)

80-0409. Chaganti, R. S. K.; German, J. (Mem. Sloan-Kettering Cancer Cent., New York, NY 10021) **Human male infertility, probably genetically determined, due to defective meiosis and spermatogenic arrest.** *Am. J. Hum. Genet.* 31: 634-641; 1979 (22 references).

Case reports are presented of 3 infertile men related through their mothers. The incidence of chromatid gaps and breaks was studied in somatic cells, sister chromatid exchanges were determined in cultured dermal fibroblasts, and meiosis was studied in testicular biopsy specimens. Desynapses, lack of chiasmata, and degeneration of spermatocytes during the first meiotic division were observed. While one of the men had been intermittently exposed to pesticides, weed killers and fungicides, it is felt that in these cases infertility was under genetic control. It is proposed that a gene for meiotic disturbance, spermatogenic arrest and azoospermia is segregating in this family.

80-0410. Varanasi, U.; Gmur, D. J.; Treseler, P. A. (Environ. Conserv. Div., Northwest & Alaska Fish. Cent., Natl. Mar. Fish. Serv., Natl. Ocean. & Atmos. Adm., Seattle, WA 98112) **Influence of time and mode of exposure on biotransformation of naphthalene by juvenile starry flounder (*Platichthys stellatus*) and rock sole (*Lepidopsetta bilineata*).** *Arch. Environ. Contam. Toxicol.* 8(6): 673-692; 1979 (41 references).

Juvenile starry flounder (*Platichthys stellatus*) and rock sole (*Lepidopsetta bilineata*) were force-fed 56 μCi 1-^{3}H- naphthalene dissolved in salmon oil. Values for radioactivity associated with naphthalene and the metabolite fraction were determined for various tissues and body fluids. Results show that these pleuronecitids extensively metabolize dietary naphthalene. The rates of decline in naphthalene concentrations were greater than the rates of decline in metabolite concentrations (dpm/mg) in liver, blood, and skin; therefore, the relative proportion of metabolies of naphthalene increased with time and at 168 hr after the initiation of naphthalene- exposure, more than 50% of the total radioactivity in both species of fish was associated with the metabolites. 1,2-Dihydro- 1,2-dihydroxy naphthalene constituted 38.7 and 39.7%, respectively, of the total extracted metabolites in livers of the naphthalene- exposed rock sole and starry flounder at 24 hr, whereas the bile from both species contained primarily ($< 90\%$) conjugates. From 24 to 168 hr, a significant ($P < 0.05$) decrease in the proportion of the dihydrodiol derivative and a concomitant increase in the proportion of conjugates were observed with livers of both rock sole and starry flounder. The pattern of metabolites in

skin of both species was qualitatively similar to that in liver: however, the proportion of the dihydrodiol was greater in skin than in liver at 24 hr. The extent of biotransformation of naphthalene and the types of metabolites remaining in tissues of flatfish are greatly influenced by both the mode of exposure and the time elapsed after the exposure is initiated. It appears therefore, that different exposures (water, food, or sediment) of pleuronectids to polycyclic aromatic hydrocarbons may result in different degrees of alteration in genetic material because of variability in accumulation of non-conjugated metabolites, some of which are implicated in covalent binding with DNA in terrestrial mammals. (Author abstract by permission, abridged)

80-0411. Hansen, P. D. (Inst. Hydrobiol. & Fischereiwiss., Univ. Hamburg, D-2000 Hamburg, BRD) **Experiments on the accumulation of lindane (γ-BHC) by the primary producers *Chlorella* spec. and *Chlorella pyrenoidosa*.** *Arch. Environ. Contam. Toxicol.* 8(6): 721-731; 1979 (9 references).

Experiments were performed on the accumulation of the pesticide lindane (γ-isomer of BHC) by two algae with different surfaces. An analytical procedure was developed for the gas chromatographic determination of lindane. At room temperature, lindane had a water solubility of 7.8 mg/l in tap water. Under the experimental conditions of 10-100 μg/*l*, 2.3% of the dissolved lindane was lost through adsorption on the glass walls of the equipment and 0.2% through evaporation. The recovery rate of lindane was 98% for the water samples and more than 90% for *Chlorella* sp. The tolerance in the gas chromatogrpahic measurements amounted to 1.2%. Investigations on the effect of lindane on the growth of *Chlorella* sp. revealed irreparable damage to the algae cells through loss of chlorophyll, coagulation, and complete sedimentation at concentrations greater than 300 μg/*l*. The experiments on sublethal accumulation showed the development of a state of equilibrium between the amount of lindane per cell and in the surrounding water with lindane concentrations of 10-100 μg/*l*. The lindane was adsorptively attached to the algal cells within a few hr, and after 3 days lindane stablized in the cells. The gelatinous surface of the algae increases the accumulation of lindane. (Author abstract by permission)

80-0412. Eroschenko, V. P. (Dep. Biol. Sci., Univ. Idaho, Moscow, Idaho 83843) **Morphological alterations in the cells of the developing quail oviduct as influenced by estradiol-17β and the insecticide Kepone: 1. Observations by light and scanning electron microscopy.** *Biol. Reprod.* 21(3): 625-638; 1979 (25 references).

Injections of 40 μg estradiol-17β per day were given for periods of 4 to 6 days to Japanese quail females. Others were given diets containing 10, 40, 80 or 160 ppm of the estrogenic insecticide Kepone (chlordecone) for similar periods of time. An increase in oviduct weight was noted in both groups. Kepone ingestion produced dose-dependent changes in oviduct structure. Changes observed in the magnum and shell gland are described. The higher dose levels of Kepone caused profuse, continuous ciliation. Kepone also apparently reduced, but did not abolish, the secretory blebs associated with the oviduct cilia.

80-0413. Groba, J.; Trzcinska, B. (Dep. Water Prot., Inst. Metereol. & Water Econ., Gdansk, Poland) **Wplyw wybranych insektycydow fosforoorganicznych i karbaminianowych na pstraga teczowego *Salmo gairdneri* R. [Effect of selected organophosphorus and carbamate insecticides on rainbow trout (*Salmo gairdneri* R.).]** *Bromatol. Chem. Toksykol.* 12(1): 33-38; 1979 (15 references) (Polish).

Rainbow trout (*Salmo gairdneri* R.) were exposed to carbaryl at 3.2 or 1.0 mg/dm³, and to propoxur at 5.6 mg/dm³ for 7 or 14 days, to assess the effects on blood hemoglobin and glucose levels. Trout exposure tests were also conducted with 1.80, 0.56, 0.32, and 0.18 mg/dm³ or carbaryl and 0.001, 0.010, 0.100, 0.320, and 1.000 mg/dm³ of chlorfenvinfos for 7 days and the activity of brain acetylcholinesterase was measured. No significant differences were noted in the blood hemoglobin and glucose levels of insecticide- exposed fish when compared with those of controls. However, in the fish exposed to carbaryl and chlorfenvinfos in lethal and sublethal doses, a considerable inhibition of the activity of brain acetylcholinesterase was observed. From these findings it is suggested that the activity of brain acetylcholinesterase of fish may be a useful criteria in evaluating the safety of carbamate and organophosphorus insecticides.

80-0414. Kouyoumjian, H. H.; Villeneuve, J. P. (Natl. Counc. Sci. Res., Marine Res. Cent. Beirut, Lebanon) **Further studies on the toxicity of DDT to planaria.** *Bull. Environ. Contam. Toxicol.* 22(1-2): 109-112; 1979 (4 references).

Colonies of *P. felina* and *C. alpina* were placed in *p,p'*-DDT. Test animals were removed from the experimental dishes at 0.25, 0.5, 1, 2, 3, 4, 7, and 14 days. Initial GLC analyses of planaria demonstrated relatively low levels of organochlorine pesticide residues 0 μg/g for DDT, 0.02 μg/g for DDD (TDE) and 0.05 μg/g for DDE. During the first 24 hours of exposure at 0.15 ppm levels, decapitated planaria were able to resist DDT absorption with subsequent low levels of DDD and DDE. After 24 hours, however, regenerating planaria absorbed DDT at an increased rate. The DDT thus absorbed slowed down the rate of regeneration. DDE appeared to be the major metabolite. Inhibitory effects of DDT were noted on asexual fission and on eye regeneration.

80-0415. Landry, T. D.; Doherty, R. A.; Gates, A. H. (Dep. Radiat. Biol. & Biophys., Pediatr. & Obstet., Environ. Health Sci. Cent., Univ. Rochester, Sch. Med., Rochester, NY 14642) **Effects of three diets on mercury excretion after methylmercury administration.** *Bull. Environ. Contam. Toxicol.* 22(1-2): 151-158; 1979 (10 references).

Mice were given a single dose of methylmercuric chloride at an average level of 9.46 mg mercury/kg. Mercury levels in critical organs of the body were affected by differences in the diets the mice consumed. Thus the diet may influence methyl mercury toxicity. A milk diet apparently decreased the proportion of benzene non-extractable mercury relative to the total mercury in the feces. Reduced demethylation would result in increased reabsorption from the gut and would decrease the rate of whole body elimination. Germ-free mice given methylmercury excreted mercury more slowly than did controls. It is suggested that altering the diet in humans may allow increased elimination of mercury from the body.

80-0416. Ando, T.; Nakano, A.; Wakisaka, I. (Dep. Public Health, Fac. Med., Kagoshima Univ., Kagoshima 890, Japan) **Effects of methylmercury on the lipid components in rats.** *Bull. Environ. Contam. Toxicol.* 22(1-2): 214-220; 1979 (11 references).

Female Wistar rats were dosed with 1, 5, or 10 mg of mercury per kg as methyl mercury chloride in 0.9% NaCl solution. No statistically significant differences were found between treated and control groups regarding lipid content in the liver. However, the percentage composition of the acid in neutral lipid or total lipid was significantly lower in the 2 higher dosed groups than in controls. The percentage coposition of the acid in phospholipid was not different between the groups. It is suggested that the slight increase of lipid fraction caused by the methyl mercury may be due to the catalytic action of methyl mercury as a trace amount metal for the lipid biosynthesis rather than due to the toxic action of the methyl mercury itself. It is felt from these results that the variations in the percentage composition of oleic acid contribute to the elucidation of the mercurial toxicity.

80-0417. Spillner, C.; Thomas, V. M.; DeBaun, J. R. (Biochem. Dep., Stauffer Chem. Co., Mt. View Res. Cent., Mountain View, CA 94042) **Effect of fenitrothion on microorganisms which degrade leaf-litter and cellulose in forest soils.** *Bull. Environ. Contam. Toxicol.* 23(4-5): 601-606; 1979 (9 references).

Experiments were carried out to determine the effect of the organophosphorous insecticide fenitrothion on the microorganisms which degrade leaf-litter and cellulose in forest soils. Leaf litter at 450 g was mechanically rotated in a 5 gal drum while being sprayed with 30 ml of the stock fenitrothion solution at a rate of 411 μg AI. The CO_2 produced was trapped in the KOH solution and precipitated as $BaCO_3$, with the precipitate being dried and weighed. In separate experiments, forest organic soil samples were combined with 1% cellulose and 1 or 5 ppm fenitrothion alone or in combination. Viable populations of bacteria, yeast, fungi and actinomycetes were determined using agar plating techniques. In the leaf litter studies, similar populations of microflora were observed in treated and untreated samples. After 11 days, there was a slight increase in CO_2 evolution in treated litter, but after 14 days the respiration rates were similar in treated and untreated samples. In the cellulose degradation studies, addition of cellulose significantly enhanced biological activity, with a 43-66% increase in CO_2 evolution from fortified soils. Respiration in soils also containing fenitrothion was not significantly different from soils fortified only with cellulose. It is concluded that fenitrothion and its soil metabolites will not be detrimental to leaf litter or cellulose degrading microorganisms.

80-0418. Hanumante, M. M.; Kulkarni, S. S. (Dep. Zool., Marathwada Univ., Aurangabad 431004, India) **Acute toxicity of two molluscicides, mercuric chloride and pentachlorophenol to a freshwater fish (*Channa gachua*).** *Bull. Environ. Contam. Toxicol.* 23(6): 725-727; 1979 (14 references).

The percent mortalities of *C. gachua* at various concentrations of $HgCl_2$ and pentachlorophenol (PCP) at 24, 48, 72, and 96 hr after exposure were determined. The calculated LD50 values were 4.1, 2.2, 1.6, and 1.4 ppm $HgCl_2$ at 24, 48, 72, and 96 hr, respectively; while corresponding LC50 values for pentachlorophenol were 0.79, 0.56, 0.43, and 0.39, respectively. The data indicated that indiscriminate uses of these molluscicides may prove to be a threat to environmental health.

80-0419. Abdelghani, A. A.; Anderson, A. C.; Mason, J. W. (Dep. Environ. Health Sci., Sch. Public Health & Tropical Med., Tulane Univ., New Orleans, LA 70112) **Screening study for the uptake of monosodium methanearsonate in the blackberry following dosing at four application rates.** *Bull. Environ. Contam. Toxicol.* 23(6): 797-799; 1979 (7 references).

Blackberry bushes (*Rubus* spp.) were sprayed at the recommended application rate for grass control of 3 lb MSMA/acre (3.39 kg/ha), and at rates of 2.25, 1.5, and 0.75 lb/acre (2.54, 1.7 and 0.85 kg/ha). Mature blackberry canes, but not new shoots or young bushes, were severely damaged by the 3 lb/acre application rate resulting in > 90% leaf necrosis after 72 hr. Plants exposed to the lower concentrations of 2.25, 1.5, or 0.75 lb MSMA/acre showed 70, 54, and 27% leaf damage after 3 days, respectively. Fruit samples taken from the bushes 44 days after dosing were analyzed for total arsenic content. Mean arsenic residues found in unwashed ripe berries were 2.3, 3.4, and 5.4 μg/g at the 0.75, 1.50, and 2.35 lb MSMA/acre applica-

tion rate, respectively. All fruits were destroyed at the highest dose level.

80-0420. Bruce, W. R. (Dep. Med. Biophys., Univ. Toronto, Toronto, Ontario M4X 1K9, Canada) **The mutagenic activity of 61 agents as determined by the micronucleus, *Salmonella*, and sperm abnormality assays.** *Can. J. Genet. Cytol.* 21(3): 319-333; 1979 (50 references).

The *in vivo* mammalian micronucleus and sperm abnormality assays and the Ames *Salmonella* mutagenicity assay were compared for 61 compounds. The *in vivo* tests permit rapid and quantitative determination of the mutagenicity of various agents, including actinomycin D, cycloheximide, methyl mercury acetate, procarbazine, and DDT. The results of the 3 assays were comparable. It was noted that the *Salmonella* and sperm abnormality tests were sufficient indicators of mutagenicity. The micronucleus testing procedure generally yielded the same results as the sperm abnormality assay, while the bacterial test was found to give results independent of the other 2 procedures.

80-0421. Moyer, J. R.; Dryden, R. D.; Chow, P. N. P. (Agric. Canada Res. Stn., Lethbridge, Alberta T1J 4B1, Canada) **Effect of barban and flamprop methyl with solution nitrogen on wheat, wild oats and green foxtail.** *Can. J. Plant. Sci.* 59(2): 351-356; 1979 (12 references).

Postemergent sprays of barban (4-chloro-2-butnyl*m* chlorocarbanilate) at the 2-leaf stage of wild oats (*Avena fatua* L.) and flamprop methyl [methyl *N*-benzoyl-*N*- (3-chloro-4- fluorophenyl)- 2-aminopropionate] at the 3-leaf stage in water or solution nitrogen fertilzer gave moderate to good control of wild oats and significant increases of 21 and 30%, respectively, in yields of wheat (*Triticum aestivum* L. 'Neepawa'). Barban and flamprop methyl had no apparent effect on nitrogen content of wheat grain. When wild oats were controlled with herbicides the decrease in plant competition permitted increased growth of green foxtail (*Seteria virdias* L. Beauv.). Solution nitrogen and hand-weeding treatment increased nitrogen in the wheat grain significantly. Large increases in numbers and dry matter yields of wild oats resulted in relatively low crop yields from solution nitrogen, e.g. non-significant with barban and a 9% increase in the flamprop methyl experiment. Either herbicide applied with solution nitrogen produced an initial injury to plant leaves. However, wheat recovered rapidly and there was no indication of reduced growth at harvest. No effect was observed when herbicides were applied separately from solutin nitrogen. (Author absract by permission)

80-0422. Friesen, G. H. (Res. Stn., Agric. Canada, Harrow, Ontario NOR 1GO, Canada) **Protection of snapbeans from substituted urea injury by prior treatment with dinitroaniline herbicides.** *Can. J. Plant. Sci.* 59(2): 535-537; 1979 (5 references).

A 3 year field study in which dinitroaniline type herbicides were applied as pre-planting soil-incorporated treatments, describes the effect of such treatment on subsequent preemergence treatments of metrobromuron and linuron in snapbeans grown on sandy loam soil with less than 2% organic matter. Dosages of chemicals used represent the maximum recommended for bean crops in Ontario. Preemergence treatments of metobromuron or linuron alone significantly reduced the yield of harvested beans. Pretreatment with trifluralin, fluchloralin, and profluralin prevented these yield losses. Linuron injury was lessened only from pre-treatment with trifluralin in 1976 and fluchloralin in 1976 and 1978. Dinitramine did not protect the snapbeans from subsequent injury by metrobromuron or linuron.

80-0423. Muirhead-Thomson, R. C. (Zool. Dep., R. Holloway Coll., Univ. London, Egham, Surrey, England) **Experimental studies on macroinvertebrate predator- prey impact of pesticides. The reactions of *Rhyacophila* and *Hydropsyche* (Trichoptera) larvae to *Simulium* larvicides.** *Can. J. Zool.* 57(11): 2264-2270; 1979 (33 references).

Acute toxicity tests with the predaceous trichopteran larvae of *Rhyacophilia dorsalis* and *Hydropsyche pellucidula* in a laboratory- simulated stream have shown that both species have a high survival rate after short exposures (15 min to 1 hr). to concentrations of temephos (Abate) and chlorpyrifos methyl that produce a mortality of 90% or more in late-instar *Simulium* larvae. A similar differential reaction to the synthetic pyrethroid permethrin was demonstrated in the case of *Hydropsyche* but not *Rhyacophila*. The implication of these findings is discussed firstly in relation to the environmental impact of *Simulium* control programmes based on application of larvicides to rivers and streams, and secondly to the wider problem of evaluating the impact of pesticides and allied toxic chemicals on stream ecosystems. It is concluded that although significant differences in tolerance level to some insecticides between prey (*Simulium*) and predator (trichopteran larvae) can be demonstrated in the laboratory, the margin of safety is not sufficiently wide to assure selective control of *Simulium* larvae by these chemicals under the less precise conditions of larvicide application in the field. (Author abstract by permission)

80-0424. Moriya, M.; Ohta, T.; Watanabe, K.; Watanabe, Y.; Sugiyama, F.; Miyazawa, T.; Shirasu, Y. (Toxicol. Div., Inst. Environ. Toxicol., Kodaira-shi, Tokyo 187, Japan) **Inhibitors for the mutagenicities of colon carcinogens, 1,2- dimethyl hydrazine and azoxymethane, in the host-mediated assay.** *Cancer Lett.* 7(6): 325-330; 1979 (18 references).

Seven-week-old male ICR mice were used in host-mediated assays of the mutagenicities of 1,2-dimethylhydrazine (DMH) and azoxymethane (AOM) for *Salmonella typhimurium*. The mice were given an oral dose of 1 of several chemicals (0.2 ml/10 g body weight) 2 hr before intraperitoneal inoculation of *S. typhimurium* G46 (his) and subcutaneous injection of DMH or AOM. Three hours after the treatment, the number of revertants (his+) and survivors were determined in the bacteria from the peritheal cavity. Mutagenicity was inhibited following treatment with carbon disulfide, tetraethylthiuram disulfide (disulfiram), sodium diethyl dithiocarbamate (DDC), ethylene-bis (dithiocarb amato) manganese (maneb), pyrazole, and aminoacetonitrile hydrogen sulfate. There was no inhibition following treatment with sodium selenite.

80-0425. Olson, M. E.; Sheehan, D. M.* (Natl. Cent. Toxicol. Res., Jefferson, AR 72079) **Failure of rotenone to interfere with 17β-estradiol action in the rat uterus.** *Cancer Res.* 39(11): 4438-4440; 1979 (11 references).

Charcoal assay and Scatchard analysis were used to determine estradiol binding to uterine estrogen receptor in the presence of rotenone using ovariectomized Sprague-Dawley rats as the test species. Sucrose density gradients were used to measure 17β- estradiol- receptor interactions. When ratios of rotenone to 17β-estradiol were in excess of 10,000, no inhibition of binding was noted in either assay. For *in vivo* testing, silastic capsules containing rotenone or 17β-estradiol were implanted into the rats. Rotenone did not interfere with 17β- estradiol- induced uterine weight gain and it did not reveal any uterotrophic properties of its own. It was concluded that rotenone does not act as an estrogen or as an estrogen antagonist.

80-0426. Quarles, J. M.; Sega, M. W.; Schenley, C. K.; Lijinsky, W. (Dep. Med. Microbiol. & Immunol., Coll. Med., Texas A&M Univ., College Station, TX 77843) **Transformation of hamster fetal cells by nitrosated pesticides in a transplacental assay.** *Cancer Res.* 39(11): 4525-4533; 1979 (31 references).

Carbaryl, aldicarb, carbofuran, Landrin (2,3,5-trimethylphenyl methylcarbamate), methomyl, Baygon (propoxur), Bux Ten, and their nitrosated derivatives were tested by the transplacental host-mediated cell culture assay for their transforming activity. Fetal cell cultures of pregnant hamsters treated with the nitrosated pesticides contained cells which exhibited transformed morphology, growth in soft agar, and tumorigenicity in nude mice. The parent pesticides were not transformed except for infrequent morphological transformations without growth in soft agar or tumorigenicity by Landrin and Bux Ten. It is concluded that the transplacental host-mediated assay is useful in determining transforming activity of various chemicals.

80-0427. Anonymous **An evaluation of chemicals of chemicals and industrial processes associated with cancer in humans based on human and animal data: IARC monographs volumes 1 to 20.** *Cancer Res.* 40(1): 1-12; 1980 (6 references).

Data on human and experimental animal carcinogenicity for 54 chemicals, groups of chemicals, and industrial processes were evaluated by an international committee at the International Agency for Research on Cancer (IARC). Monographs for these chemicals were published in 20 volumes of the *IARC Monographs on the Evaluation of the Carcinogenic Risk Chemicals to Humans.* Among the chemicals adequately documented to be definitely carcinogenic were arsenic compounds, asbestos, diethyl stilbesterol (DES), 2-naphthylamine, and vinyl chloride. Group 2 chemicals probably carcinogenic to humans included acrylonitrile, amitrole, CCl_4, HCH (BHC), lindane, and PCBs. Insufficient evidence for carcinogenicity was found for DDT, dieldrin, chlordane, heptachlor, or trichloroethylene.

80-0428. Dahl, A. R.; Hodgson, E. (Toxicol. Program, Dep. Entomol., North Carolina State Univ., Raleigh, NC 27650) **The interaction of aliphatic analogs of methylenedioxyphenyl compounds with cytochromes *P*-450 and *P*-420.** *Chem. Biol. Interact.* 27(2-3): 163-175; 1979 (27 references).

Measurements were taken of the spectra which resulted from the interaction of a series of substituted dioxolanes with microsomal cytochromes *P*-450 and *P*-420. Interactions were also studied between substituted dioxolanes and purified cytochrome *P*-450. The compounds reacted with ferric cytochrome *P*-450 producing complexes demonstrating type I optical difference spectra. After incubation with NADPH, spectra with peaks at about 430 nm were obtained. Exceptions to these findings were noted with dioxolane, 4-methyldioxolane and 4-ethyldioxolane. The complexes formed by the majority of the compounds inhibited the binding of carbon dioxide to the cytochrome.

80-0429. Smith, A. G.; Cabral, J. R. P.; De Matteis, F. (Biochem. Pharmacol. Sect., MRC Toxicol. Unit, Med. Res. Counc. Lab., Carshalton, Surrey, England) **A difference between two strains of rats in their liver non-haem iron content and in their response to the prophyrogenic effect of hexachloro benzene.** *Chem. Biol. Interact.* 27(2-3): 353-363; 1979 (28 references).

Female Agus and Porton-Wistar rats were fed diets which contained 0.01% hexachlorobenzene (HCB). Hepatic porphyria developed in the Agus rats at a much faster rate than it did in the Porton-Wistar rats. Similarly the Agus rats demonstrated a greater inhibition of liver uroporphyrinogen decarboxylase activity. A marked stimulation of the 5- aminolevulinate synthetase activity was noted in the Agus rats. A higher level of non-haem iron

was found in the liver of Agus rats than in the Porton-Wistar rats. This finding provides further evidence for the involvement of liver iron in the pathogenesis of HCB-induced porphyria. Agus rats were less susceptible than Porton-Wistar rats to 3,5- diethoxycarbonyl- 1,4-dihydrocollidine, another porphyrogen agent.

80-0430. Lock, E. A. (Cent. Toxicol. Lab., Biochem. Mech. Sect., Imp. Chem. Ind. Ltd., Macclesfield, Chesire SK10 4TJ, England) **Toxic action of 2′-chloro- 2,4-dinitro-5′,6-di (trifluoromethyl) diphenylamine in the rat.** *Chem. Biol. Interact.* 28(1): 35-46; 1979 (35 references).

Adult male Alderley Park SPF rats were administered the acaricide CDTD [2′-chloro- 2,4-dinitro-5′,6i (trifluoromethyl) diphenylamine] orally by stomach tube (1 ml/kg body weight), by iv injection (0.5 ml/kg), or by ip injection (1 ml/kg). The LD50 of CDTD administration as a solution in dimethylformamide was 0.6-1.2 μmol/kg given iv, 4.7 μmol/kg given ip, and 233 μmol/kg administered orally. Administration ip of CDTD resulted in toxicity typical of uncoupling agents, such as complete inhibition of ATP synthesis 4 hr after dosing. A single oral dose of 58 μmol CDTD/kg produced an increase in the water content of the brain and spinal cord, accompanied by increased Na^+ concentrations. These observations indicated that CDTD toxicity operates on two levels; early deaths appear to be due to uncoupling of oxidative phosphorylation, and delayed deaths probably related to an increase in fluid in the brain and spinal cord.

80-0431. Sattar, M. A.; Paasivirta, J. (Dep. Chem., Univ. Jyvaskyla, SF-40100 Jyvaskyla 10, Finland) **Effects of MCPA on the germination and root system of cereal crops.** *Chemosphere* 8(4): 201-204; 1979 (15 references).

In order to study the effects of the herbicide 2-methyl-4- chlorophenoxy acetic acid (MCPA) on seed germination, soil from a farm land was dried and ground, and MCPA sodium salt was added to achieve 0, 10, 50, 100, 200, 500 or 1000 ppm. Wheat, rye or maize was planted in the soil, which contained the proper amount of water to duplicate the field capacity moisture (34%), and allowed to grow for 6 wk. Results were similar for the 3 species tested. Germination percentage was significantly decreased by 10 ppm MCPA, and no germination occurred at 500 ppm. There was a dose-related increase in root abormalities, which included short swollen lateral branches and small tumors. In addition, there was a dose-related decrease in the dry weights of shoots and roots, with wheat shoots treated with no MCPA weighing 2.25 g, and those with 200 ppm MCPA weighing 0.96 g.

80-0432. Oakley, G. P., Jr. (Chronic Dis. Div., Bur. Epidemiol., CDC, Atlanta, GA) **Drug influences on malformations.** *Clin. Perinatol.* 6(2): 403-414; 1979 (57 references).

The relationship of drug use to human teratogenesis is reviewed. In deciding whether or not a drug causes birth defects, animal studies, case studies, and epidemiological studies form the basic data that may be used as evidence. Drugs are usually placed in 1 of 4 categories: known human teratogen, suspected human teratogen, not suspected to be a human teratogen, or suggested mutagen or teratogen in lower animal studies. The teratogenic potentials of selected drugs are discussed. Exogenous female hormones, benzodiazepines, anesthetic gases, clomiphene citrate, warfarin (used as oral anticoagulant), anticonvulsants, trimethadione, metronidazole, amphetamines, and lithium are cited as possible teratogens from several previus studies. Fetal anomalies resulting from maternal exposure to these agents and th periods of gestation affected are also mentioned.

80-0433. Chin, B. H.; Sullivan, L. J.; Eldridge, J. M.; Tallant, M. J. (T.R. Evans Res. Cent., Diamond Shamrock Corp., Painesville, OH 44077) **Metabolism of carbaryl by kidney, liver, and lung from human postembryonic fetal autopsy tissue.** *Clin. Toxicol.* 14(5): 489-498; 1979 (9 references).

An *in vitro* tissue maintenance technique was used to determine the metabolic profile of carbaryl in various human post-embryonic fetal autopsy tissue. Tissue explants were incubated in growth medium containing ^{14}C 1-naphthyl or *N*-methyl-^{14}C-carbaryl for 18 hr, and the medium was then analyzed by DEAE-cellulose column chromatography. It was shown that fetal liver performed the metabolic processes of demethylation, hydrolysis, hydroxylation, and oxidation, followed by conjugation. The kidney produced naphthyl glucuronide and naphthyl sulfate from carbaryl, while the lung produced naphthyl sulfate. The metabolic processes of fetal liver were similar to adult liver; however, the anionics from fetal liver amounted to 20% of those found in adult liver. The metabolic activities of fetal kidney and lung were close to the corresponding human adult tissues. Silica gel chromatography of the ether-extractable neutral fractions from DEAE-cellulose showed 3,4, and 9 ether-extractable metabolites from lung, kidney and liver, respectively.

80-0434. Belitser, V. A. (Acad. Sci. Ukrainian SSR, Kiev, USSR) **Antikolinesterazna diya pestitsidiv yak pokaznik ikh neiroembriotoksichnogo efektu. [Anticholinesterase action of pesticides as an index of their neuroembryotoxic effect.]** *Dopov. Akad. Nauk. Ukr. RSR Ser. B* 8: 650-654; 1979 (15 references) (Russian).

The effects of the organochlorine pesticide toxaphene on the nervous systems of pregnant animals and their offspring were examined. Daily administration of doses corresponding to 0.05 and 0.01 LD50 were found to

cause changes in the cholinesterase activity of the heart, spinal cord, and fetal neurocytes; ultrastructural disturbances in myocardiocytes and myelin fibers; and decreased differentiation of nerve structures in neonates. The anticholinesterase activity of organochlorines may be one of the indicators in the inhibition of structural differentiation during pre- and post natal development.

80-0435. Kenaga, E. E. (Dow Chem., Midland, Michigan) **Acute and chronic toxicity of 75 pesticides to various animal species.** *Down Earth* 35(2): 25-31; 1979 (26 references).

In this review, data on the acute and chronic toxicity of 75 pesticides to 10 different animal species is presented in tabular form. Insecticides are grouped as chlorinated hydrocarbons, phosphorus-containing chemicals, carbamates, and miscellaneous. Herbicides are listed separately. A multiple regression computer program was used to calculate correlations, and equations were developed to aid in predicting toxicity values of one species from known toxicity values of another species. Some of the conclusions reached are that mallard acute oral LD50s can be predicted from rat acute oral LD50s, and salt water fish species LC50s can be predicted from rainbow trout LC50s. In addition, bluegill, rainbow trout and fathead minnow LC50s can be predicted from each other's LC50s. For acute toxicity, the most useful predictive indicator organisms were found to be the rat LD50, rainbow trout LC50 and daphnia LC50.

80-0436. Olajos, E. J.; Rosenblum, I. (Inst. Comp. & Hum. Toxicol., Albany Med. Coll., Union Univ., Albany, NY 12208) **Measurement of neurotoxic esterase activity in various subcellular fractions of hen brain and sciatic nerve homogenates and the effect of diisopropyl fluoroposphate (DFP) administration.** *Ecotoxicol. Environ. Saf.* 3(1): 18-28; 1979 (24 references).

Studies were performed to determine neurotoxic esterase (NTE) activity in subcellular fractions of hen brain and sciatic nerve homogenates. The inhibitory effect of diisopropyl fluorophosphate (DFP) was also studied. Enzymes were assayed in homogenates of control animals and animals treated with DFP. From brain homogenates, the microsomal fraction showed the highest NTE activity (16 μg phenol/ml), while myelin showed no activity. The postmitochondrial and cytosol fractions showed less than 2 μg/ml activity. From sciatic nerves, the microsomal pellet again showed the highest activity. DFP caused an inhibition of NTE activity in whole brain (93.8%), whole sciatic (36.7%), brain microsomes (90.6%) and sciatic microsomes (100.0%).

80-0437. Kenaga, E. E.; Moolenaar, R. J. (Health & Environ. Sci., Dow Chem. Co., Midland, MI 48640) **Fish and *Daphnia* toxicity as surrogates for aquatic vascular plants and algae.** *Environ. Sci. Technol.* 13(12): 1479-1480; 1979 (4 references).

The relative degree of acute toxicity of thousands of chemicals of heterogeneous structures was compared for fishes, daphnids, aquatic vascular plants, and algae. Aquatic animals were more sensitive indicators of toxic effects than were plants or algae. Compounds that were toxic at under 1 ppm for daphnids, fishes, aquatic vascular plants, and algae represented 2.4, 1.3, 0.12, and 0.02%, respectively, of the total tested for each of these 4 groups of organisms. Of the 27,781 chemicals tested on aquatic plants and 49,082 tested on the alga *Chlorella*, all but 3 compounds were either not toxic to these organisms under 1 mg/l, or were toxic to fish and *Daphnia* at 1 ppm or less. (Author abstract reprinted by permission of the American Chemical Society)

80-0438. Sun, M. C.; Chang, Z. G.; Shau, M. Z.; Huang, R. H.; Chou, T. C. (Lab. Mol. Pharmacol., Inst. Basic Med. Sci., Peking, China) **The mechanism of ageing of phosphonylated acetylcholinesterase.** *Eur. J. Biochem.* 100(2): 527-530; 1979 (10 references).

Sarin, soman and 2 homologue organophosphates were used to study the ageing process of acetyl cholinesterase. A correlation was noted between the rate of ageing and the number of methyl groups. The higher the electron-donating capacity of the residue, the faster the dealkylation. The organophosphates were added to a nerve muscle preparation at a final concentration of 0.01 μg/ml Tyrode solution and a transitional increase of the concentration amplitude was noted. Addition of acetylcholine at a final concentration of 47 μM completely blocked the response to electric stimulation. Prepartions poisoned with soman behaved quite differently from those poisoned with sarin. When comparisons were made of the results obtained by poisoning with each of the 4 compounds, no ageing was noted with sarin after 12 hr, partial ageing occurred in 12 hours and in 3 hours with the 2 homologues, and some treated preparations aged completely in 10 minutes. Ageing was much faster for electrically stimulated preparations than for resting ones.

80-0439. Hertel, C.; Quader, H.; Robinson, D. G.; Marme, D. (Inst. Biol. II, Univ. Freiburg, Freiburg, BRD) **Possible mode of action of anti-microtubular herbicides.** *Eur. J. Cell Biol.* 20(1): 121-122; 1979.

Calcium transport was studied in isolated mitochondrial and microsomal fractions from corn and zucchini. The presence of anti-microtubular herbicides did not inhibit the uptake of calcium into microsomes; the uptake into mitochondria was almost completely prevented. The effect of carbamate type derivatives was weaker than those of the dinitroaniline type. It is suggested that the herbicides in question act by deregulating the cellular calcium level.

80-0440. Vijverberg, H. P. M. (Dep. Vet. Pharmacol. & Toxicol., Univ. Utrecht, NL-3572 BP Utrecht, The Netherlands) **Frequency dependent effects of the pyrethroid insecticide decamethrin in frog myelinated nerve fibers.** *Eur. J. Pharmacol.* 58(4): 501-504; 1979 (9 references).

Experiments were performed to determine frequency dependent effects of decamethrin on frog nerve fibers. Dissected sciatic nerves placed in isotonic KCl were exposed to 10^{-6} *M* insecticide. Membrane potentials were measured by clamping the ends of the nerves with electrodes. A frequency dependent depression of action potential was observed. This was due to a progressive membrane depolarization brought about by the summation of depolarizing after-potentials. When intact nerves were cut, thereby testing effects on single nodes of Ranvier, it appeared that the after-potential was due to a long-lasting prolongation of the transient increase in sodium permeability. The authors contend that the pyrethroid insecticide affects the sodium channels of nerve membranes.

80-0441. Iwanami, Y.; Iwamatsu, M.; Okada, I.; Iwadare, T. (Biol. Inst., Yokohama City Univ., Yokohama 236, Japan) **Comparison of inhibitory effects of royal jelly acid and myrmicacin on germination of *Camellia sinensis* pollens.** *Experientia* 35(10): 1311-1312; 1979 (11 references).

The effects of royal jelly acid, an essential constituent for the antibacterial activity of royal jelly, and myrmicacin on the germination of pollens of *Camellia sinensis* are examined and compared to the inhibitory action of capric acid. *Camellia* pollens were cultured on separate culture media containing royal jelly acid at 100 ppm, myrmicacin at 50 ppm, or capric acid at 50 ppm at pH 4.5. The ungerminated pollens were transfered to untreated culture media after 1, 2, 3, and 4 hr, and the growth of pollens was measured. After transfer to the untreated media, germination was restored in pollens exposed to royal jelly acid and myrmicacin. A complete loss of germination occurred in pollens exposed to the capric acid treated media which was not restored even after transfer to the untreated media. Previous studies have shown the existence of a terminal carboxyl group and a normal chain of 8 to 10 carbon atoms in the structure of myrmicacin and analogous insect-secreted compounds. It is suggested that such natural inhibitors of pollen germination be employed as soft inhibitors in biological research.

80-0442. Youngman, R. J.; Dodge, A. D.; Lengfelder, E.; Elstner, E. F. (Sch. Biol. Sch., Univ. Bath, Bath BA2 7AY, England) **Inhibition of paraquat phytotoxicity by a novel copper chelate with superoxide dismutating activity.** *Experientia* 35(10): 1295-1296; 1979 (20 references).

A chelate with superoxide dismutase activity, D-penicillamine copper complex, was shown to inhibit paraquat toxicity in flax cotyledons (*Linum usitatissiumum* var. Reina). Paraquat-stimulated chlorophyll loss and ethane production were markedly reduced by this complex. The role of superoxide in the action of paraquat is briefly discussed. (Author abstract by permission)

80-0443. Allais, J. P.; Gripois, D.; Moreteau, B.; Ramade, F. (Lab. Zool., Univ. Paris-Sud, F-91405 Orsay Cedex, France) ***N*-Acetylation enzymatique de la tryptamine per des homogenats de cerveaux de *Locusta migratoria* avant es a pres intoxication par la chlordimeform ou le lindane. [Enzymatic *N*-acetylation of tryptamine by brain homogenates of *Locusta migratoria* before and after intoxication by chlordimeform or lindane.]** *Experientia* 35(10): 1357-1359; 1979 (26 references) (French).

Brain homogenates of *Locusta migratoria* are found to possess enzymes capable of catalyzing the *N*-acetylation of tryptamine. A main product of the enzymatic reaction is isolated and identified as *N*-acetyltryptamine by chromatography analysis. Both insecticides, chlordimeform and lindane, inhibit enzyme activity. A direct correlation between the degree of intoxication and acetylation of tryptamine is described. (Author abstract by permission)

80-0444. Jones, A. R.; Fakhouri, G.; Gadiel, P. (Dep. Biochem., Univ. Sydney, Sydney New South Wales 2006, Australia) **The metabolism of the soil fumigant 1,2-dibromo- 3-chloropropane in the rat.** *Experientia* 35(11): 1432-1434; 1979 (27 references).

The soil fumigant 1,2-dibromo- 3-chloropropane (I) undergoes hydrolysis in the rat to a series of epoxide metabolites. Alkylation of glutathione by these epoxides produces 2 urinary metabolites identified as the mercapturic acids VI (R = $COCH_3$) and II (R = $COCH_3$). Hydrolysis of the epoxides produces the male antifertility agents α-chlorohydrin (IX, X = Cl) and α-bromohydrin (IX, X = Br) which are oxidatively metabolized to oxalic acid (XII), thus causing renal damage. These metabolic pathways can explain the toxic nature of the fumigant as a carcinogen, a male chemosterilant and as an agent causing kidney damage. (Author abstract by permission)

80-0445. Khare, L. J. (Dep. Botany, Govt. Coll. Rampura 458118, India) **Pollen damage by vapours of two herbicides.** *Geobios* 5(5): 217-218; 1978 (2 references).

Amitrole and 2,4,5-T solutions were kept in beakers at concentrations of 100, 250, 500, and 1000 ppm. The beakers were covered with tightly spread muslin cloth and pollen was sprinkled on top of the cloth. At the end of each day pollen was taken from the muslin surface and kept on the extracts of stigmatic surfaces of pea flowers.

The tested pollen had been damaged by the herbicidal vapours. Treatment at the higher dose level (1000 ppm) reduced the percentage of viable pollen to 32% after exposure to 2,4,5-T and to 50% after exposure to amitrole. Even the lower concentrations of 100 and 250 ppm had effects which were visible after longer periods of time.

80-0446. Daburov, K. N. (N. I. Pirogov Moscow Med. Inst. 2, Moscow, USSR) **Gigienicheskoe obosnovanie reglamenta i spol'zovaniya bakterial'n'ikh insektitsidov v sel'skom khozyaistve i dpoustim'ikh ostatochn'ikh kolichestv ikh produentov *Bacillus thiringiensis* v rastitek'n'ikh produktakh. [Hygienic guidelines for use of bacterial insecticides in agriculture and suggested permissible residual amounts of their producers *Bacillus thuringiensis*, in vegetable products.]** *Gig. Sanit.* 44(9): 27-31; 1979 (4 references) (Russian).

Studies were carried out to determine the permissible residual amounts of *Bacillus thuringiensis* (bacterial insecticides) in vegetable products. The survival of these organisms after various culinary and technological treatments, and their reproductive capacities in finished products, were determined.

80-0447. Engst, R.; Macholtz, R. M.; Kujawa, M. (Cent. Inst. Nitrition, Potsdam, DDR) **Metabolizm lindana v organizme mikroba, teplokrovnykh zhivotnykh i cheloveka. [Metabolism of lindane in microbes, warm blooded animals, and humans.]** *Gig. Sanit.* 44(10): 64-65; 1979 (Russian).

The metabolism of lindane in molds, rats, and in exposed humans was studied, using ^{14}C-labeled lindane in the experimental organisms. Rapid splitting of 2,3,4,5,6-pentachloro cyclohexene (PCCH) and the formation of CO_2 were seen in the molds. Sixteen identified and 4 unknown metabolites were found in the molds. The major metabolites were oentachloro benzene, 2,3,4,6- and (or) 2,3,5,6- tetrachlorophenol (TeCP), 1,2,3,4-tetrachlorobenzene (TeCB), 1,2,3- trichlorobenzene (TCB), 2,4,6- trichlorophenol (TCP; TPA) tetrachloro cyclohexenol (TeCCOL), and small amounts of hexachlorobenzene. The half-life of lindane in the rats was found to be 3 to 5 days. Free metabolites accounted for 9% of the input; metabolites conjugated with glucuronides for 5%. The principal metabolites were pentachlorophenol (PCP), 2,3,4,6- and (or) 2,3,5,6-TeCP, 2,4,6-TCP, and TCP were found. Increasing amounts of the metabolites became conjugated with glucuronic acid as the exposure time prolonged. Metabolites conjugated with SH-groups were found in the urine. The oral LD50 of γ-pentachloro cyclohexane in rats and mice is 2,930-4,180 mg/kg and 3,690-4,930 mg/kg, respectively.

80-0448. Pastushenko, T. V.; Manenko, A. K. (Med. Inst., Lvov, USSR) **Eksperimental'noe obosnovanie predel'no dopustimoi kontsentratsii fenazona v vozdukhe rabochei zony. [Experimental substantiation of maximum permissible concentration of phenazon in the air of work area.]** *Gig. Tr. Prof. Zabol.* (8): 48-50; 1979 (Russian).

In an attempt to determine the maximum permissible concentration of the herbicide phenazon (chlorazine; 1-phenyl- 4-amino- 5-chloro pyridazone-6) in the air of work areas, the toxicity of the compounds was studied in albino rats and mice, guinea pigs and rabbits. Single skin applications of phenazon at 600, 1500 and 3000 mg/kg was not accompanied by symptoms of poisoning or local irritation. Phenazon had weak cumulative properties (coefficient of cumulation 6.98). The acute threshold effect of phenazon after 4 hr inhalation was 10 mg/m³. Chronic inhalation exposure to phenazon at 1 mg/m³ (for 4 mo) resulted in a decrease of the phagocytic index, an increased WBC count, decreased lymphocyte count and increased aldolase activity. Chronic inhalations of phenazon at 10 mg/m³ did not induce clinical manifestations of poisoning, but caused significant pathomorphological changes of internal organs: hyperemia of white pulp and plethora of the spleen, plethora of the myocardium, and mild dystrophy of liver parenchyma were noted. On the basis of obtained data, it is recommended that concentrations of phenazon in the air of work areas should not exceed 0.5 mg/m³.

80-0449. Brigelius, R. (Inst. Pharmakol. Toxicol. & Pharm., Fachber. Tiermed., Univ. Munich, D-8000 Munich, BRD) **Influence of Cu-penicillamine on paraquat toxicity: investigation of lipid metabolism in the isolated perfused rat liver.** *Hoppe-Seyler's Z. Physiol. Chem.* 360(9): 1132-1133; 1979 (2 references).

Paraquat was found to induce an increase in absorption at 235 nm and changes in fatty acid composition of phosphatidyl choline and phosphatidyl ethanolamine. A significant decrease in 18:2 and an increase in 20:4 were noted while the unsaturated/ saturated fatty acid ratio was not changed. Microsomes showed a decrease in phospholipid content. Native superoxide- dismutase offered only minimal protection. Cu-penicillamine was found to penetrate biological membranes and supply artificial superoxide dismutase which was taken up by the liver cells. Cu-penicillamine lowered the paraquat-induced diene absorption. It is suggested that superoxide radicals are involved in the paraquat-induced lipid peroxidation.

80-0450. El-Guindy, M. A.; Madi, S. M.; Riskallah, M. R. (Cent. Agric. Pestic. Lab., Minist. Agric., Dokki, Egypt) **The effect of synergised Matacil on the enzymatic activity in a Matacil- resistant *Spodoptera littoralis* (Boisd).** *Int. Pest Control* 21(5): 108-111; 1979 (10 references).

The effects of insecticide synergists on the toxic activity of Matacil (aminocarb), and their relationship to enzymes in Matacil-resistant Egyptain cotton leafworms were investigated. Doses of 0.5 μl Matacil alone, or mixed with

one of 7 synergists (1:5) were applied topically to resistant insects and LD50 values and slopes of mortality regression lines were estimated. The greatest synergistic effects were produced by isosafrole, followed by safrole, MGK 264 (ENT-8184), piperonyl butoxide, and bucarbolate (LD50 values 130.3, 187.6, 314.5, and 354.8 g/g body weight, respectively). Activities of aliphatic esterase (Ali-E) and alkaline phosphatase (APase) of resistant larvae were significantly reduced when Matacil + synergists were applied at the 4th instar stage. Acetylcholinesterase (AchE) activities were suppressed significantly only by the Matacil-isosafrole mixture.

80-0451. Marquis, L. Y.; Shimabukuro, R. H.*; Stolzenberg, G. E.; Feil, V. J.; Zaylskie, R. G. (Metab. & Rad. Res. Lab., Agric. Res. Sci. & Educ. Admin., USDA, Fargo, ND 58105) **Metabolism and selectivity of fluchloralin in soybean roots.** *J. Agric. Food Chem.* 27(6): 1148-1156; 1979 (28 references).

Fluchloralin [*N*- (2-chloroethyl)- 2,6-dinitro-*N*-propyl-4- (trifluoromethyl) aniline] is metabolized rapidly by soybean [*Glycine max* (L.) Merr.] roots to several chloroform-soluble residue. No single metabolite represented more than 4% of the total ^{14}C in the roots. The posttreatment solution contained fluchloralin and all chloroform-soluble and possibly all water-soluble metabolites found in the root tissues. The metabolites in the posttreatment solution were formed by root tissues and not by chemical, photochemical, or microbial degradation. Four chloroform-soluble metabolites were isolated from the posttreatment solution and characterized by mass spectrometry. Soybean roots metabolized fluchloralin at a higher rate than corn (*Zea mays* L.) roots. This correlated with the greater resistance displayed by soybean roots (relative to corn roots) to fluchloralin injury. (Author abstract reprnted by permission of the American Chemical Society)

80-0452. Firestone, D.; Clower, M., Jr.; Borsetti, A. R.; Teske, R. H.; Long, P. E. (Bur. Foods, US FDA, Washington, DC 20204) **Polychlorodibenzo- *p*-dioxin and pentachlorophenol residues in milk and blood of cows fed technical pentachlorophenol.** *J. Agric. Food Chem.* 27(6): 1171-1177; 1979 (30 references).

Three cows were fed 20 mg/kg/day of commercial technical-grade pentachlorophenol (PCP) for 10 days and then 10 mg/kg/day of the PCP for an additional 60 days. No clinical effects were observed during the treatment period or during the 165-day posttreatment period. Although the commercial PCP contained 7 dioxins, only 3 dioxins, 1,2,3,6,7,8- hexachlorodioxin, 1,2,3,4,6,7,8- heptachlorodioxin, and octachlorodioxin, were found in milk, body fat, and blood samples. Hexachlorobenzene (HCB), present in the commercial PCP, was also found in the samples. PCP in composite whole milk and HCB and total dioxins in composite milk fat rose to 4 mg/kg, 200 μg/kg, and 85 μg/kg, respectively, during the treatment period. When PCP feeding was stopped, PCP in the milk and blood declined within a few days to basal levels of less than 0.1 mg/kg. HCB and dioxin half-life was approximately 50 days. (Author abstract reprinted by permission of the American Chemical Society)

80-0453. Savolainen, K.; Pyysalo, H. (Tech. Res. Cent. Finland, Food Res. Lab., SF-02150 Espoo 15, Finland) **Identification of the main metabolite of ethylenethiourea in mice.** *J. Agric. Food Chem.* 27(6): 1177-1181; 1979 (26 references).

The degradation of 2-imidazolidinethione (ethylenethiourea) in mice involves oxidation at the sulfur atom, giving 2-imidazolin-2-yl sulfenate as the major product. This compound was synthesized by irradiation of an aqueous solution of ethylenethiourea with Co^{60} γ rays and purified from the irradiation mixture by high-pressure liquid chromatography. The synthesis was verified by TLC, IR, NMR, and mass spectrometry methods. Other possible mechanisms for degradation are discussed. (Author abstract reprinted by permission of the American Chemical Society)

80-0454. Kogel, W.; Mueller, W. F.; Coulston, F.; Korte, F. (Inst. Okol. Chem., Ges. Strahlen & Umweltforsch., Munich, BRD) **Fate and effects of pentachloro nitrobenzene in rhesus monkeys.** *J. Agric. Food Chem.* 27(6): 1181-1185; 1979 (22 references).

Pure pentachloro nitrobenzene (PCNB, quintozene) was administered to rhesus monkeys as single oral doses of 0.5, 2, or 91 mg/kg bodyweight and in a 70-day feeding study at a level of 2 ppm in the daily diet. PCNB was readily absorbed from the gastrointestinal tract, metabolized, and excreted rapidly by both the urinary and the fecal route. Pentachloro aniline and pentachloro thioanisole were the major metabolites, accompanied by a variety of other biotransformation products containing nitrogen reduced to anilines and sulfur as thiophenols, thioanisoles, or sulfoxide. Feeding PCNB for 70 days did not result in significant accumulation of PCNB or its metabolites. Parameters of clinical chemistry, hematology, endocrinology, and histopathology remained within the limits of variation which are normal for rhesus monkeys. (Author abstract reprinted by permission of the American Chemical Society)

80-0455. Feroz, M.; Khan, M. A. Q. (Dep. Biol. Sci., Univ. Illinois, Chicago, IL 60680) **Metabolism, tissue distribution, and elimination of *cis*- ^{14}C chlordane in the tropical freshwater fish *Cichlasoma* sp.** *J. Agric. Food Chem.* 27(6): 1190-1197; 1979 (37 references).

Tropical freshwater cichlids, *Cichlasoma* sp., weighing 300 g each, were individually placed in 16 l of water with 80 μg of *cis*-^{14}C chlordane for 72 hr. The fish rapidly absorbed the compound, accumulating 2.8 ppm in visceral fat, 1.2 ppm in bile, and 1.1 ppm in gall bladder. Recovery of the radioactivity added to water at the end of 72 hr was estimated to be 64.8 and 6.1% in fish and exposure water, respectively. The rate of elimination of the absorbed radioactivity was about 2.9%/wk. Dichlorochlordene, oxychlordane, chlordene chlorohydrin, dihydroxy heptachlor, dihydroxy dihydrochlordene plus 4 unidentified compounds accounted for 12.5% of the radiocarbon recovered from fish and exposure water. The remainder was determined to be unchanged *cis*-chlordane. (Author abstract reprinted by permission of the American Chemical Society)

80-0456. Hollingshaus, J. G.; Abu-El-Haj, S.; Fukuto, T. R.* (Div. Toxicol. & Physiol., Dep. Entomol., Univ. California, Riverside, CA 92521) **Delayed neurotoxicity of *O*- alkyl and *O*-aryl phenyl phosphonothioate analogs related to leptophos administered orally to the hen.** *J. Agric. Food Chem.* 27(6): 1197-1201; 1979 (23 references).

Analogues of leptophos [*O*- (4-bromo-2,5-dichlorophenyl) *O*-methyl phenyl phosphonothioate] were examined for acute toxicity to mice and houseflies and for delayed neurotoxic activity in adult hens following administration of a single oral dose. Development of ataxia after recovery from acute poisoning was the criterion for delayed neurotoxic activity. All mono- and dichlorophenyl analogues were delayed neurotoxic, the 2,5-dichlorophenyl analogue being the most potent delayed neurotoxic compound tested. Substitution of the methyl by an ethyl group abolished delayed neurotoxic activity in both leptophos and the 2,5-dichlorophenyl analogue at doses of 1000 mg/kg. The propyl and butyl analogues of the latter were also nondelayed neurotoxic at 500 and 333 mg/kg, respectively. Substitution of methyl for ethyl in EPN [*O*-*p*-nitrophenyl *O*-ethyl phenyl phosphonothioate] did not alter its delayed neurotoxicity. (Author abstract reprinted by permisson of the American Chemical Society)

80-0457. Kramer, K. J.; McGregor, H. E.; Mori, K. (US Grain Mark. Res. Lab., Agric. Res. Sci. & Educ. Admin., USDA, Manhattan, Kansas 66502) **Susceptibility of stored-product insects to pyridyl ether analogues of juvenile hormone.** *J. Agric. Food Chem.* 27(6): 1215-1217; 1979 (11 references).

Four pyridyl ether analogues of juvenile hormones were each mixed separately with whole wheat or ground wheat medium and tested for activity against stored product insects. (*E*)-5-[[5-(3- butyl-3-methyl- oxiranyl)- 3-methyl-2- pentenyl]oxy]- 2-ethylpyridine was effective at 2 and 0.1 ppm in preventing larval and adult development, respectively, from eggs of *Tribolium confusum* Jacquelin duVal. The ID_{95} doses of 0.04-50 ppm also suppressed the development of adult progeny of *Plodia interpunctalla* (Hubner), *Ephestia cautella* (Walker), *Sitotroga cerealella* (Olivier), *Rhyzopertha dominica* (F.), *Oryzaephilus surinamensis* (L.), and *Sitophilus oryzae* (L.). Other compounds were less effective. Addition of a propyl substituent on the epoxide terminus of (*E*)-5- [[5-(3,3- dimethyloxiranyl) -3-methyl- 2-pentenyl] oxy]-2- ethylpyridine increased activity about tenfold. (Author abstract reprinted by permission of the American Chemical Society)

80-0458. Mumby, S. M.; Hammock, B. D.* (Div. Toxicol. & Physiol., Dep. Entomol., Univ. California, Riverside, CA 92521) **Stability of epoxide containing juvenoids to dilute aqueous acid.** *J. Agric. Food Chem.* 27(6): 1223-1228; 1979 (42 references).

The morphogenetic activity on *Tenebrio molitor* and the stability in weak aqueous acid of 13 *p*-bromophenyl geranyl ether epoxides containing juvenile hormone mimics, radiolabeled juvenile hormone, and 3 additional nonhalogenated hormone mimics were examined. Although changes in the molecule remote to the epoxide caused variations in hydrolytic stability, major changes resulted from varying the substituents on the epoxide. Increasing the size of alkyl substituents on the epoxide resulted in increased hydrolytic stability, and mono- and disubstituted epoxides were more stable than tri- and tetrasubstituted epoxides. As a derivatization technique, conversion of a trisubstituted epoxide to its diol proved unreliable when sulfuric acid in aqueous tetrahydrofuran was used but quantitative when dilute aqueous buffers were used. (Author abstract reprinted by permission of the American Chemical Society)

80-0459. Chin, B. H.; Sullivan, L. J.; Eldridge, J. E. (T.R. Evans Res. Cent., Dep. Saf. Assessment, Diamond Shamrock Corp., Painesville, OH 44077) ***In vitro* metabolism of carbaryl by liver explants of bluegill, catfish, perch, goldfish, and kissing gourami.** *J. Agric. Food Chem.* 27(6): 1395-1398; 1979 (10 references).

The purpose of this study was to demonstrate the metabolic role of livers of 5 species of fish toward insecticide carbaryl (Sevin), 1-naphthyl *N*-methylcarbamate. Carbaryl (naphthyl-^{14}C or N-methyl-^{14}C) was applied to a growth medium containing liver explants of the 5 species. Each mixture was incubated for 18 hr after which the medium was analyzed by diethylaminoethyl (DEAE)-cellulose column chromatography. Based on the metabolic profile analysis, hepatic tissues from each species all performed the metabolic processes of demethylation and/or hydrolysis, hydroxylation, and oxidation, followed by conjugation. The most significant common metabolite in all species chromatographed as a dihydrodihydroxy carbaryl glucuronide. (Author abstract reprinted by permission of the American Chemical Society)

80-0460. Miyazaki, A.; Sakai, M.; Muramo, S. (Osaka Agric. Res. Cent., Osaka 583, Japan) **Comparative metabolism of enantiomers of chlordene and chlordene epoxide in German cockroaches, in relation to their remarkably different insecticidal activity.** *J. Agric. Food Chem.* 27(6): 1403-1405; 1979 (5 references).

Both enantiomers (optically pure) of chlordene and chlordene epoxide were metabolized in German cockroaches in order to clarify the remarkable difference of toxicity between both enantiomers of these insecticides. Of 4 metabolic products of (+)- and (-)-chlordenes, the amount of chlordene epoxide produced from (+)-chlordene was about 7-fold larger than that from its (-)-enantiomer, and this amount was comparable to the unmetabolized (-)-chlordene epoxide remaining after application of an amount comparable in toxicity to that of (+)-chlordene. These results, combined with our previous findings that (+)-chlordene produced chemically its (-) epoxide, and both (-)-chlordene and its oxidized (+) epoxide had no activity, unambiguously indicated that (-)-chlordene epoxide was insecticidal, per se, while (+)-chlordene was insecticidal after metabolic conversion to the corresponding (-) epoxide. (Author abstract reprinted by permission of the American Chemical Society)

80-0461. Chin, B. H.; Sullivan, L. J. (Carnegie-Mellon Inst. Res., Carnegie-Mellon Univ., Pittsburgh, PA 15213) **Carbaryl metabolism by the selected tissues of the dog via the *in vitro* explant- maintenance technique.** *J. Agric. Food Chem.* 27(6): 1419-1420; 1979 (9 references).

Recently we introduced the *in vitro* tissue-maintenance technique which faithfully reproduced the metabolites of carbaryl (1-naphthyl *N*- methylcarbamate) found in urine samples of similarly dosed animals. This study was undertaken to demonstrate the contributory metabolic role of kidney, liver, and lung of the dog toward carbaryl using this *in vitro* technique. Hepatic tissues of the dog incubated with low dosages of radioactivity labeled carbaryl actively performed demethylation, hydrolysis, hydroxylation, and oxidation, followed by sulfate conjugations. The kidney and lung of the dog made 1 and 3 of the 5 liver-generated metabolites, respectively. The metabolic profiles from these selected organs clearly show that the metabolic products found *in vitro* represent a composite of metabolites formed from at least the liver, lung, and the kidney. (Author abstract reprinted by permission of the American Chemical Society)

80-0462. Umetsu, N.; Toia, R. F.; Mallipudi, N. M.; March, R. B.; Fukuto, T. R.* (Div. Toxicol. & Physiol., Dep. Entomol., Univ. California, Riverside, CA 92521) **A novel antagonistic effect to the toxicity in the rat of *O,O,S*-trimethyl phosphorothioate by its phosphorothionate isomer.** *J. Agric. Food Chem.* 27(6): 1423-1425; 1979 (4 references).

O,O,S-Trimethyl phosphorothioate (thiolate isomer) has a rat oral LD50 value of approximately 15 mg/kg, with death occurring up to 22 days following administration. However, coadministration of the isomeric *O,O,O*- trimethyl phosphorothioate prevents this intoxication. Poisoning by the thiolate isomer, when given at either the 60 or 200 mg/kg level, is completely blocked by 1.0% (w/w) of the antagonist (thionate isomer). At the 60 mg/kg dose, 0.5% of the antagonist gave partial protection, and ~50% of the treated animals recovered. Administration of the antagonist 24 and 48 hr after treatment by the thiolate did not affect any reversal of the poisoning symptomology or prevent mortality. (Author abstract reprinted by permission of the American Chemical Society)

80-0463. Prentiss, W. C.; Sigafoos, C. R. (Rohm & Haas Co., Spring House, PA 19477) **Isothiazolones for leather preservation. II. Military leather.** *J. Am. Leather Chem. Assoc.* 74(10): 322-328; 1979 (2 references).

The characteristics, uses, and efficacy of the fungicide Kathon LP (n-octyl- 4-isothiazol- 3-one) in leather preservation are discussed. Screening tests against various common fungal species have shown that Kathon LP offers considerably more protection to leather than chlorophenol (PCP) or Hyamin 2389. Kathon has excellent shelf aging characteristics with 90-100% retention of active ingredient after 18 mo at room temperature. Toxicity data indicated that isothiazolone is moderately toxic to mammals; acute oral LD50 (rats), acute dermal LD50 (rabbits), and acute inhalation (rats) values obtained were 3160 mg/kg, 5620 mg/kg, and none at > 2 mg/l, respectively. Full protection of wet blue leather, often used for military purposes, is achieved at the 0.2% application level.

80-0464. Koizumi, A.; Shiojima, S.; Omiya, M.; Nakano, S.; Sato, N.; Ikeda, M. (Dep. Environ. Health, Sch. Med., Tohoku Univ., Sendia 980, Japan) **Acute renal failure and maneb (manganous ethylenebis [dithiocarbamate]) exposure.** *J. Am. Med. Assoc.* 242(23): 2583-2585; 1979 (10 references).

A 62-year-old man spread maneb on about 200 sq m of garden and subsesquently was taken to the emergency clinic with complaints of oliguria, diarrhea, and hoarseness. Based on clinico-biochemical data, he was found to have acute renal failure; the serum levels of BUN, creatinine, and potassium were 144.3 mg/dl, 14 mg/dl, and 5.8 mEq/l, respectively. The ST segment depression in V_{4-6}, reciprocal ST segment elevation in V_{1-3}, and inverted T waves in V_5 and V_6 were recorded on ECGs. Both the renal failure and the ECG abnormalities disappeared after hemodialysis. The possibility exists that the maneb caused the acute renal failure. (Author abstract by permission)

80-0465. Kupfer, D.; Miranda, G. K.; Navarro, J.; Piccolo, D. E.; Theoharides, A. D. (Worcester Found. Exp.

Biol., Shrewsbury, MA) **Effects of inducers and inhibitors of monooxygenase on the hydroxylation of prostaglandins in the guinea pig.** *J. Biol. Chem.* 254(20): 10405-10414; 1979 (60 references).

In order to investigate the effects of inducers of monooxygenases, prostaglandins (PGs) were incubated with liver microsomes from male Hartley guinea pigs treated with DDT, benzo(a)pyrene, or a mixture of chlorinated biphenyls (Aroclor 1254). There was marked elevation of 19-hydroxylation of PGE_1, PGE_2, PGA and PGA_2 without significantly affecting 20-hydroxylation. Differences between benzo(a)pyrene and Aroclor treatments were noted; Aroclor treatment elevated the demethylation of ethylmorphine, benzphetamines and p-chloro-N- methylaniline (PCMA), while benzo[a]pyrene treatment had no effect on demethylation of ethylmorphine and only a marginal effect on that of PCMA. Hydroxylation of PGs by kidney cortex microsomes was not affected by benzo(a)pyrene or Aroclor. The type of monooxygenase induced was delineated using inhibitors of monooxygenase. The results indicate that in the guinea pig, hydroxylation of PG's at the ω (20) and ω-1(19-) positions is catalyzed by different monooxygenases and that the inducers tested affect several hepatic monooxygenases with different specificities toward xenobiotics.

80-0466. Hassan, H. M.; Fridovich, I. (Dep. Biochem., Med. Cent., Duke Univ., Durham, NC 27710) **Paraquat and *Escherichia coli*. Mechanism of production of extracellular superoxide radical.** *J. Biol. Chem.* 254(21): 10846-10852; 1979 (29 references).

Paraquat is readily reduced by *Escherichia coli* to the univalently reduced blue monocation radical. The radical reacts rapidly with dioxygen to yield O_2^-. Experiments were devised to test the possibility that the *E. coli* envelope may be permeable to O_2^- causing significant cell damage. The reduction of paraquat depended upon a NADPH:paraquat diaphorase, present in the cytosol. Most of the paraquat reduced in the cell reoxidized *in situ* and thus most of the O_2^- production was intracellular. O_2^- appeared to be unable to cross the cell envelope in either direction, and the only O_2^- which was effective in raising the rate of biosynthesis of superoxide dismutase was generated intracellularly.

80-0467. Kochansky, J. P.; Robbins. W. E.; Lofgren, C. S.; Williams, D. F. (Insect Physiol. Lab., Agric. Res., SEA, USDA, Beltsville, MD 20705) **Design of some delayed-action toxicants for baits to control red imported fire ants.** *J. Econ. Entomol.* 72(5): 655-658; 1979 (14 references).

New candidate insecticides for *Solenopis invicta* Buren were prepared which should require metabolism to the known toxicants fluoroacetic acid and trichlorfon before appreciable toxicity could be expressed. Cholesteryl fluoroacetate, sitoseryl fluoroacetate, N-dodecyl 2-fluoroacetamide, and, to a lesser extent, several fatty acid esters of trichlorfon gave delayed kill of imported fire ant workers. In certain cases, these compounds gave delayed kill over an increased range of concentrations, compared to the underivatized toxicants. (Author abstract by permission)

80-0468. Chio, H.; Metcalf, R. L. (Eli Lilly & Co., Greenfield, IN 46140) **Detoxication mechanisms for aldrin, carbofuran, fonofos, phorate, and terbufos in four species of Diabroticites.** *J. Econ. Entomol.* 72(5): 732-738; 1979 (6 references).

^{14}C radiolabeled aldrin, carbofuran, fonofos, phorate, and terbufos were used to evaluate insecticide degradation and metabolic pathways in adults of northern corn rootworm, *Diabrotica longicornis* (Say), southern corn rootworm, *D. undecimpuncata howardi* Barber, western corn rootworm, *D. virgifera* LeConte, and striped cucumber beetle *Acalymma vitata* (F.). A number of ^{14}C labeled degradation products were demontsrated for each insecticide in each species, and metabolic pathways of epoxidation, hydroxylation, thioether oxidation, desulfuration, and hydrolysis were identified. In general, the southern corn rootworm showed the highest capacity for degradation of the insecticides and the stripped cucumber beetle the lowest. The biochemical data were consistent with the levels of insecticide resistance in the 4 species. (Author abstract by permission)

80-0469. Chang, S. C.; Woods, C. W. (Insect Reprod. Lab., ARS, USDA, Beltsville, MD 20705) **Metabolism of ^{14}C penfluron in the boll weevil.** *J. Econ. Entomol.* 72(5): 781-784; 1979 (4 references).

The metabolism of ^{14}C-penfluron (2,6-difluoro- *N*-[[[4- (trifluormethyl) phenyl] amino] ^{14}C-carbonyl]benzamide) was studied in *Anthonomus grandis grandis* Boheman. Recoveries of radioactivity of 99 and 94.36% were obtained after 4 days and 1 wk, respectively, from weevils that had been injected with 124,970 dpm (4.61 μg/weevil). On the basis of the total injected amount, 97.74% of the label recovered from the extract of weevils 4 days posttreatment were unchanged penfluron and 0.16% was conjugates. Similarly at 1 week posttreatment, 90.56% were unchanged penfluron and 0.2% was conjugates. Less than 1% of additional radioactivity was recovered from weevil residues in both experiments. Four days posttreatment the recovery from excreta extract was 3.41%; 1.33% were unchanged penfluron; 0.20% was 2,6- difluorobenzamide; and 1.87% were conjugates. The conjugates consisted of 2 metabolites which upon acid hydrolysis yielded a single relatively nonpolar metabolite that was assumed to be a hydroxylated derivative of penfluron. (Author abstract by permission)

80-0470. Lichtenstein, E. P.; Kunstman, J. L.; Fuhremann, T. W.; Liang, T. T. (Dep. Entomol., Univ. Wisconsin, Madison, WI 53706) **Effects of atrazine on the toxicity, penetration and metabolism of carbofuran in the house fly.** *J. Econ. Entomol.* 72(5): 785-789; 1979 (10 references).

Experiments were conducted to obtain additional information relative to the effects of the herbicide atrazine on the toxicity, penetration, and metabolism of ^{14}C-carbofuran in *Musca domestica* L. Topically applied carbofuran yielded, after 24 hr, an LD50 at 0.16 μg/fly but dropped to 0.08 μg/fly when a nontoxic dose of 15 μg of atrazine also had been applied. In the presence of atrazine, twice as much ^{14}C-carbofuran was left on the outside of the flies as compared to controls. Conversely, amounts of the less toxic metabolite 13-hydroxy- carbofuran in the chloroform extraction phase of fly excreta were only 30% of those excreted by control flies. Amounts of the major metabolite 3-hydrocarbofuran in the water extraction phase of fly excreta were 2.57% of the applied radiocarbon after ^{14}C-carbofuran plus atrazine treatment and 4.14% in excreta from control flies, thus indicating a reduction in the formation of this carbofuran metabolite due to atrazine. The respective figures were 0.38 and 0.97% for 3-hydroxycarbofuran phenol and 0.12 and 0.31% for carbofuran phenol. Data indicated that the herbicide atrazine inhibited the penetration of ^{14}C-carbofuran into houseflies or stabilized it on the cuticle, thus making its biological activity available over longer time periods. In addition, it inhibited the metabolic detoxication of the insecticide into less insecticidal compounds, whose toxicity in turn also could be enhanced by atrazine. The increased stability of ^{14}C-carbofuran, both outside and inside the insect body, resulted in an increased toxicity of the insecticide, thus explaining to some extent the synergism of carbofuran with atrazine in house flies. (Author abstract by permission)

80-0471. Lourens, J. H. M. (Lab. Exp. Entomol., Univ. Amsterdam, NL-1098 SM Amsterdam, The Netherlands) **Genetic basis for organochlorine resistance in *Amblyomma variegatum* and information on the susceptibility of *A. lepidum* to organochlorine acaricides.** *J. Econ. Entomol.* 72(5): 790-793; 1979 (17 references).

Baseline data on susceptibility to organochlorine acaricides were obtained for *Amblyomma lepidum* Donitz and *A. variegatum* (F.). One strain of *A. variegatum* from East Africa which could not be controlled by toxaphene also showed resistance to lindane and dieldrin. Single crosses between this strain and a susceptible strain resulted in both susceptible and resistant progeny (1:1 ratio). Backcrosses of some of these resistant progeny with susceptible mates produced the same 1:1 ratio of susceptible and resistant offspring. Heterogenous progenies always demonstrated a horizontal trajection in dose-mortality relationship. A single dominant allele for resistance is therefore operating. Backcrosses of other resistant progeny also showed partitioning into susceptible and resistant segregants but there was a preponderance of susceptible offspring. (Author abstract by permission)

80-0472. Agarwal, D. K.; Seth, P. K.; Gupta, P. K. (Ind. Toxicol. Res. Cent., Lucknow 226001, India) **Effect of endosulfan on drug metabolizing enzymes and lipid peroxidation in rat.** *J. Environ. Sci. Health C* 13(1): 49-62; 1978 (32 references).

Groups of adult male albino rats receiving daily oral doses of 0, 2.5, or 5.0 mg/kg endosulfan in corn oil for 14 days. Total liver weights, but not body weights, were significantly increased ($P < 0.01$) after both endosulfan dosage regimens. The supernatant from homogenized and centrifuged (9000 x g) livers were used as enzyme source for assays of aminopyrine *N*-demethylase, aniline hydroxylase, and tyrosine transferase. Activities of all 3 enzymes were significantly increased at 2.5 mg/kg dose ($P < 0.05$, $P < 0.01$, and $P < 0001$, respectively) and at the 5.0 mg/kg dose ($P < 0.01$, $P < 0.001$, and $P < 0.001$, respectively), indicating a strong dose-effect relationship of endosulfan in lipid peroxidation.

80-0473. Schuetz, A. W.; Samson, D. (Dep. Popul. Dyn., Sch. Hyg. & Publ. Health, Johns Hopkins Univ., Baltimore, MD 21205) **Nuclear requirement for post-maturational cortical differentiation of amphibian oocytes: effects of cycloheximide.** *J. Exp. Zool.* 210: 307-319; 1979 (45 references).

Defolliculated intact, enucleated, and enucleated-reinjected oocytes from sexually mature female frogs (*Rana pipiens*) were exposed to progesterone, or to 10 μg/ml cycloheximide plus progesterone. After 19-27 hr incubation periods the oocytes were scored for cycloheximide- induced changes, and for progesterone- induced nuclear and cytoplasmic maturation. Three stages of cortical alterations in the cortical cytoplasm varied depending upon the time at which oocytes were examined following hormonal or antibiotic treatment. Cycloheximide did not produce cortical alteration in control or hormone-treated oocytes until after germinal vesicle breakdown. Enucleated oocytes did not undergo cortical alterations leading to cytoplasmic maturation following the addition of cycloheximide. Reinjection of nuclear material into the enucleated oocytes restored the ability of cycloheximide to induce cortical alterations following steroid induction of cytoplasmic maturation.

80-0474. Rahmatullah, M.; Ali M. S.; Yusuf, H. K. M.; Jahan, R.; Asuduzzaman, M.; Chowdhury, A. A. (Dep. Biochem., Fac. Med., Univ. Hong Kong, Hong Kong) **ATP-induced reversal of malathion inhibition of citric acid fermentation with *Aspergillus niger*.** *J. Ferment. Technol.* 57(4): 379-381; 1979 (8 references).

Inhibitory effects which malathion exerts on the production of citric acid in *Aspergillus niger* are postulated to be due to the direct action of the insecticide on ATP synthesis. To test this hypothesis, ATP was introduced into growing cultures of the fungi to which malathion had been added at 10, 50, or 90 μg/ml medium. The citric acid content was measured at 72, 96, 120, 144, 168, and 192 hr in cultures with and without malathion, and in cultures with malathion with and without added ATP. Malathion inhibited citric acid production in a dose dependent manner at each incubation time tested. In flasks containing malathion at 10 or 50 μg/ml, ATP (1m*M*) partially reversed inhibition of citric acid synthesis by stimulating citrate synthesis. In the flask containing 50 μg/ml malathion, this stimulation by the addition of ATP was more pronounced, whereas stimulated citrate production in flasks containing 90 μg/ml malathion was observed only after 192 hr of incubation. It was concluded that malathion, by inhibiting the oxidative metabolism of *A. niger*, also interferes with the production of cellular ATP which results in decreased citric acid synthesis.

80-0475. Anger, W. K.; Setzer, J. V. (Div. Biomed. & Behav. Sci., NIOSH, US Dep. HEW, Cincinnati, OH 45226) **Effects of oral and intramuscular carbaryl administrations on repeated chain acquisition in monkey.** *J. Toxicol. Environ. Health* 5(5): 793-808; 1979 (35 references).

Five young-adult male cynomolgus monkeys (*Macaca fascicularis*) were trained to press buttons in sequence. The animals were given both oral and im carbaryl, after the animal's learning rate was constant. The total time required to complete the 4-response chain 130 times increased after exposure to carbaryl. The mean session lengths in minutes after im injections of 1, 3, 5, and 10 mg/kg carbaryl were 22, 25, 36, and 54 minutes, respectively. The mean number of errors made by all the animals was 33 over all control days. This error rate increased after exposure to 1, 3, 5, and 10 mg/kg injections of carbaryl to 40, 44, 58, and 42, respectively. It is suggested that the lower error rate at the highest dose level resulted from the increased delay in response time from those animals receiving this dose level. Oral administrations started at a dose level of 5 mg/kg and increased until an effect was noted. Sometimes oral dosing was followed by a long session or a large number of errors, but this did not occur frequently. Due to the lack of consistence in the effect, oral dosing was discontinued at 50 mg/kg.

80-0476. Chernoff, N.; Kavlock, R. J.; Rogers, E. H.; Carver, B. D.; Murray, S. (Health Eff. Res. Lab., Exp. Biol. Div., US EPA, Research Triangle Park, NC 27711) **Perinatal toxicity of maneb, ethylene thiourea, and ethylene bis isothiocyanate sulfide in rodents.** *J. Toxicol. Environ. Health* 5(5): 821-834; 1979 (16 references).

Maneb, ETU (ethylene thiourea) and EBIS were given by gastric intubation to timed-pregnant random-bred CD-1 mice, Sprague-Dawley rats, and Ela:ENG golden hamsters. ETU was given to guinea pigs by placing a feeding needle at the back of the mouth and the animal then slowly swallowed the solution. Mice were killed on day 18, rats on day 21, hamsters on day 15, and guinea pigs on day 35. Maneb caused hydrocephalus in fetuses of rats receiving 480 mg/kg/day dose levels. No fetotoxic effects were noted in those receiving EBIS at levels of 30 mg/kg/day. ETU was a potent teratogen causing at 40 mg/kg/day evidence of hydrocephalus, encephalocele, kyphosis, and defects of the digits. Fetal toxicity was not observed with maneb up to 1500 mg/kg/day, ETU up to 200 mg/kg/day, or EBIS up to 200 mg/kg/day. Fetal toxicity was not noted in the hamster caused by ETU at 100 mg/kg/day nor in the guinea pig at 100 mg/kg/day. Neonates exposed to EBIS perinatally did not demonstrate dose-related alterations in behavioral development. ETU caused significant increases in the open-field activity levels of neonates. Maneb and EBIS caused maternal limb paralysis in the rat. This effect was also noted in the mouse at higher doses.

80-0477. Stroo, W. E.; McCormack, K. M.; Hook, J. B.* (Dep. Pharmacol. & Toxicol., Michigan State Univ., East Lansing, MI 48824) **Renal functional effects of 2,4,5-trichloro phenoxyacetic acid and silvex after acute and prolonged exposure.** *J. Toxicol. Environ. Health* 5(5): 845-854; 1979 (19 references).

Male Sprague-Dawley rats were given 2,4,5-T or silvex by sc injection or through dietary exposure. A dose level of 100 mg/kg decreased *p*-aminohippurate (PAH) and 2,4,5-T accumulation into renal cortical slices by 58 and 34%, respectively. When 2,4,5-T was given daily for 2 wk, the depression in PAH or 2,4,5-T accumulation was not enhanced. Dietary exposure over prolonged periods to silvex caused a significant decrease in renal organic anion and cation transport similar to that noted after 2,4,5-T exposure. It is concluded that silvex and 2,4,5-T are both potential substrates for the renal organic anion transport system and would also appear to have similar pharmacological effects.

80-0478. Tomura, M.; Eto, K.; Sagara, K.; Sato, T. (Sch. Intern. Med. 3, Fac. Med., Kumamoto Univ., Kumamoto, Japan) **[A case of disturbance of the liver and the kidney.]** *Kanzo (Acta Hepatol. Jpn.)* 20(9): 1016; 1979 (Japanese).

A 22-yr-old man swallowed paraquat dichloride in a suicide attempt. On the 2nd day after poisoning, laryngopharyngitis and esophagitis, and on the 6th day, severe jaundice and increased enzymatic activity in the biliary duct system were observed, and the clinical picture resembled intrahepatic stagnation hepatitis. Laparoscopical hepatic biopsy showed conspicuous fatty

degeneration of hepatic cells around the central zone of lobules and deposition of fat without enlargement of Glisson's capsule. Slight cellular infiltration suggested toxic hepatitis. The MIF test was negative although a reduction of tubular function was observed on renal function tests. No abnormalities were observed in the lungs, the adrenal or the peripheral nervous system, and the patient recovered.

80-0479. Doycheva, L. (Fac. Biol., Kl. Okhrudski State Univ., Sofia, Bulgaria) **Analitichno ustanovyavane na letalnite kontsentratsii na kherbitsidniya preparat lasagrin (Alakhlor) pri ostra eksperimentalna intoksikatsiya na ednoleten sharan (*Cyprinus carpio* L.). [Analytical determination of lethal concentrations of the herbicide Lasagrin (Alachlor) under acute experimentally induced intoxication of one-year-old carp (*Cyprinus carpio* L.)]** *Khidrobiologiia* 9: 33-37; 1979 (7 references) (Bulgarian).

The acute toxicity of the herbicide Lasagrin (Alachlor) to 1-yr-old carp was determined. Dose-effect relationships were analyzed by the use of algorithms. Relationships between toxicty of the chemical, concentrations, and the time factor were established. Lethal concentrations (LC50, LC95, LC05) together with their confidence limits at 24, 48, and 96 hr, respectively, were determined. This information, together with the lowest concentration which was harmless to the fish, were used in drawing a toxicity profile of the pesticide.

80-0480. Markov, F. I.; Isakulova, D. I. (Kirghiz Exp. Stn. Sugar Beet, Frunze, USSR) **Insektitsidy protiv ozimoi sovki na sakharnoi svekle. [Insecticides against winter cutworm in sugar beet.]** *Khim. Sel'sk. Khoz.* 17(6): 22-26; 1979 (10 references) (Russian).

The effectiveness of various insecticides against winter cutworm in sugarbeet crops is reviewed. In addition to extensive data on the control of cutworm, the results of evaluation of the effect of insecticides on the sugar beet yield are briefly summarized. Spraying of sugar beet with a 2% γ-isomer of HCH (lindane), 10% Bazudin (diazinon), and 5% Valexon (phoxim) (at rates of 25 and 50 kg/ha) and 4% chlorophos (at a rate of 50 and 100 kg/ha) had no negative effect on the quality of beets and did not decrease the sugar content.

80-0481. Kukalenko, S. S.; Volodkovich, S. D. (All-Union Res. Inst. Chem. Plant Prot., Leningrad, USSR) **Novye sistemnye fungitsidy za rubezhom. [New foreign systemic fungicides.]** *Khim. Sel'sk. Khoz.* 17(7): 30-36; 1979 (55 references) (Russian).

The spectrum of systemic fungicides used currently abroad is reviewed. Among the heterocyclic compounds of the greatest interest are the fungicides Bayleton (triadimefon), Persulon and tricyclazole. Bayleton is mildly toxic to warm-blooded animals (LD50 after po administration to rats was 363-568 mg/kg), and harmless to bees and beneficial insects. Persulon has low toxicity to warm-blooded animals (LD50 for rats after po administration was 5,000 mg/kg). Tricyclazol is mildly toxic to rats and mice (LD50 after po administration was 305 and 250 mg/kg, respectively).

80-0482. Parshutin, S. M. (All-Union Sci. Res. Inst. Plant Prot. Leningrad, USSR) **2,4-D aminnaia sol', 40%-nyy vodorastvorimyy kontsentrat. [2,4-D amine salt, 40% aqueous concentrate.]** *Khim. Sel'sk. Khoz.* 17(8): 57-59; 1979 (Russian).

Instructions on the application of 2,4-D amine salt, 40% aqueous concentrate, effectiveness against various species, and the basic toxicological characteristics are presented. 2,4-D amine salt has low toxicity in warm-blooded animals (LD50 for rats 1,150-1,200 mg/kg), but it was recommended that protective clothing and a respirator be worn during its application.

80-0483. Popov, P. V.; Shapovalova, G. K.; Galitsina, V. V. (All-Union Sci. Res. Inst. Chem. Plant Prot. Agents, Leningrad, USSR) **Rezistentnost' n-sekomykh h dikhlorvosu i khlorofosu. [Resistance of insects to dichlorvos and chlorophos.]** *Khim. Sel'sk. Khoz.* 17(8): 59-61; 1979 (3 references) (Russian).

The development of resistance and cross-resistance was studied in 75 consecutive generations of houseflies exposed to dichlorvos vapors for 20-60 sec or to liquid dichlorvos applied to the skin. The first generation was originally sensitive. The resistance factor, expressed as LD50, increased from 1 in the first generation to 5.1 in F14 and to 6.8 in F75 in the experiments in which dichlorvos vapors were used. The resistance, expressed a the 50% knock-down concentration, rose from 1 to 8.8 in F75. The cross-resistance to chlorophos was 1 in F1, reaching its highest value (> 230) in F35, and declining to > 63 in F75. The flies also developed cross-resistance to diazinon, carbophos (malathion), phthalophos (phosmet), gardona (tetrachlorvinphos), benzophosphate, propoxur, phenetcarb, lindane, fenitrothion, neopinamin (phtaltrin), valaxon (phoxim), permetryne, and Co-Ral (coumaphos). In the experiments in which dichlorvos was applied on the cuticle, the resistance increased from 1 in F_1 to 6 in F_{22} and the cross-resistance to chlorophos (trichlorfon) increased from 1 to 112, respectively, (expressed as LD50).

80-0484. Fedosenbov, M. A. (Sci. Res. Inst. Vegetable Prod., Moscow, USSR) **Vliianie dlitel'nogo primeneniia gerbitsidov v aven'iakh ovoshchekormovogo sevooborota na biologicheskuiu aktivnost' i nitratnyy rezhim pochvy. [Effects of long-term use of herbicides in sequence of**

vegetable-fodder crop rotation on biological activity and nitrate dynamics in soil.] *Khim. Sel'sk. Khoz.* 17(9): 19-31; 1979 (8 references) (Russian).

The effects of various herbicides and their combinations on the soil respiration and nitrification were studied in 1-3 yr vegetable-fodder crop rotations. The herbicides investigated were ramrod (propachlor; 8 kg/ha), 2M-4CM (MCPB; 2 kg/ha) + ramrod (8 kg/ha), 2M-4CM (2 + 3 kg/ha) + ramrod (8 kg/ha), 2M-4CM (2 kg/ha) + 2M-4CM banvel-D (dicamba) mixture + ramrod (8 kg/ha), semeron (desmetryne; 0.5 kg/ha) + ramrod (8 kg/ha), ramrod (8 kg/ha) + 2M-4CM (2 + 3 kg/ha) + semeron (0.5 kg/ha), ramrod + 2M-4CM banvel-D mixture + pyramine (pyrazon; 5 kg/ha), pyramine (5 kg/ha) + semeron (0.5 kg/ha), pyramine (5 kg/ha) + 2M-4CM (2 kg/ha) + semeron (0.5 kg/ha), pyramine (5 kg/ha) + 2M-4CM (2 + 3 kg/ha) + semeron (0.5 kg/ha), and pyramine + 2M-4CM banvel-D mixture + semeron (0.5 kg/ha). In the 1-3 yr crop rotations with cabbage, fodder beet, oats, and peas, the herbicides caused only a slight and short-term depression of the soil respiration, lasting only up to 15-30 days after treatment, after which the respiration intensified in relation to the control in some cases. The nitrification processes were affected by the number of treatments and the type of herbicide. The soil nitrate level was significantly lower in cabbage fields treated with ramrod compared with the controls, but the nitrate level measured a few days after ramrod treatment was higher than in the controls, if ramrod was preceded by the mixture of 2M-4CM and banvel-D. Pyramine and its combinations increased the nitrate levels in the soil compared with the controls.

80-0485. Peshkova, G. P.; Ulina, A. I. (Riazan Med. Inst., Riazan, USSR) **Primenenie dikurana i simazina na posevakh ozimoy pshenitsy v Riazanskoy oblasti. [Use of dicuran and simazine on winter wheat crops in Riazan Oblast.]** *Khim. Sel'sk. Khoz.* 17(9): 31-32; 1979 (5 references) (Russian).

Dicuran (chlortoluron) (2-3 kg/ha) and simazine (0.25-1 kg/ha) were used for preemergence treatment in winter wheat. Treatment with the highest dose of dicuran (3 kg/ha) caused an increase in the protein content in the grains (11.8% versus 11.4% in the controls), but there were no other qualitative changes attributable to the treatment. The treatment with dicuran and simazine caused no changes in the organoleptic properties of bakery products tested by a panel. The biological quality of the grains, tested by the *Tetrahymena pyriformis* test, showed a somewhat better quality of the grains from the treated fields compared with the controls. No dicuran and simazine residues were found in the grains by TLC.

80-0486. Gar, K. A.; Zamanskaia, I. Sh.; Gushchina, N. I.; Syrova, L. M.; Esaulov, A. G. (All-Union Sci. Res. Inst. Chemical Means Plant Prot., Moscow, USSR) **Ostatki etafosa v ovoshchakh i iabolkakh. [Residues of etaphos in vegatables and apples.]** *Khim. Sel'sk. Khoz.* 17(9): 41-44; 1979 (2 references) (Russian).

The residue levels of etaphos (*O*-ethyl- *O*-2,4-dichlorophenyl- *S*-propyl- thiophosphate) were determined in treated tomatoes, cucumbers, radishes, and apples. Greenhouse soil was treated with etaphos doses of 10, 20, or 40 kg/ha (7.5% granulate) 10 days before tomato, cucumber, and radish were sown. One month after application the etaphos residue level in the roots was 150-200 mg/kg, but the residue levels were 10-20 times lower in the aerial parts of the plants than in the roots. The residue level was less than 0.1 mg/kg in unripe tomatoes and cucumbers, and no residue was found in ripe tomatoes and cucumbers. The necessary waiting time after the application of etaphos in tomato and cucumber cultures was determined to be 60-70 days. The residue level was 3-20 mg/kg in ripe radishes, indicating that this preparation should not be used in radish cultures. Apple-trees were sprayed with 30% wetted powder or 50% emulsion of etaphos 3-5 times at 25-day intervals during the vegetation period; the first treatment was on May 17, the last 1 mo before harvest. The dose was 1,500 l/ha at 0.05-0.15% concentration. The highest residue level found in the skin of apples 1 mo after harvesting was 0.3-0.5 mg/kg after treatment with 0.15% emulsion, but the residue level was below 0.1 mg/kg in most samples. The residue level was consistently lower after treatment with the powder suspension than after treatment with the emulsion. The authors concluded that the acceptability of etaphos treatment of apple-trees will have to be decided pending the establishment of the maximum allowable residue levels.

80-0487. Bock, K. W.; Clausbruch, U. C. V.; Winne, D. (Inst. Pharmacol. & Toxicol., D-3400 Goettingen, BRD) **Absorption and metabolism of naphthalene and benzo(a)pyrene in the rat jejunum *in situ*.** *Med. Biol.* 57(5): 262-264; 1979 (10 references).

Intestinal loops were prepared from male Wistar rats. Naphthalene or benzo(a)pyrene was injected into the closed loop at concentrations of 100 nmol. Benzo(a)pyrene was absorbed more slowly from the gut than was naphthalene. Naphthalene appeared in the portal blood unchanged whereas the benzo(a)pyrene was metabolized extensively. It is suggested that diffusion of some rapidly absorbed compounds may markedly reduce the metabolism of lipid soluble compounds by the intestinal mucosa *in vivo*.

80-0488. Hurle, K. (Inst. Phytomed., Univ. Hohenheim, Stuttgart, BRD) **Einfluss des Strohverbrennens auf Aktivitat, Sorption und Abbau von Herbiziden im Boden. [Effects of straw burning on the activity, absorption, and degradation of herbicides in soils.]** *Meded. Fac. Landbouwwet. Rijksuniv. Gent* 43(2): 1097-1107; 1978 (8 references) (German).

The effect of wheat straw-burning residue on the herbicidal activity, adsorption, and degradation of herbicides was studied in field, greenhouse, and laboratory experiments, respectively. In the field experiments, the straw left after harvesting was burned and the burning residue was incorporated in the upper 10-12 cm soil layer, after which *Brassica napus* was sown, and the field was subsequently treated with 4 different doses of atrazine or napropamide (0.75, 1.5, 3, and 6 kg/ha). The herbicidal effect was evaluated in April of the following year. The herbicidal effect was significantly reduced in the soil mixed with the straw-burning residue compared with the field from which the straw had been removed. The greenhouse experiments demonstrated the reduced activity of atrazine, simazine, chlorotoluron (chlortoluron), and napropamide with increasing concentration of straw-burning residues in the soil. Soils containing such residues had increased adsorption capacity for herbicides (atrazine and DNOC). The elevated adsorption capacity decreased in the course of time, slower in dry soil and much faster in soils with changing moisture content. The laboratory tests demonstrated that the degradation of atrazine and DNOC was slower in soils containing straw-burning residues than in soils without such residues. In soils containing straw-burning residue, the atrazine concentration remained nearly constant during 98 days, while it dropped to nearly 1 tenth in the soil without such residue. In the presence of straw burned residue, the DNOC content in the coil dropped to about 1 fourth of the initial level in 50 days, but no DNOC was detectable after 15 days in the soil without straw-burning residue.

80-0489. Hester, P. G.; Rathburn, C. B., Jr.; Rogers, A. J. (West Florida Arthropod Res. Lab., Florida Dep. Health & Rehab. Serv., Panama City, FL 32401) **Small plot field tests of an oil formulation against mosquito larvae and non-target organisms.** *Mosq. News* 39(3): 566-568; 1979 (5 references).

The effectiveness of oil formulations of Florida Mosquito Larvicide (a mixture of 0.37% Triton X-207 and 1.0% 30W motor oil in No. 2 diesel oil) against *Aedes taenirchynchus* was evaluated. Third instar mosquito larvae, and several non-target aquatic species (minnows, large and small shrimps, and blue crabs) were added to test ponds and the pesticide was applied at the rate of 37.4 l/ha of water surface. The preparation proved to be 100% effective against the mosquito larvae, while slight mortality (17%) occurred only among large shrimps. None of the other non-target organisms were adversely affected by the spraying.

80-0490. Benigni, R.; Bignami, M.; Carere, A.; Conti, G.; Conti, L.; Crebelli, R.; Dogliotti, E.; Gualandi, G.; Novelletto, A.; Ortali, V. A. (Ist. Super. Sanit., Rome, Italy) **Mutational studies with diquat and paraquat *in vitro*.** *Mutat. Res.* 68(3): 183-193; 1979 (40 references).

Diquat and paraquat were assayed in the following tests: Ames test in *Salmonella typhimurium* (strains TA1535, TA1537, TA1538, TA98 and TA100) with and without rat-liver microsomal fractions; resistance to 8-azaguanine in *Salmonella typhimurium* (strain *his*G46, TA92 and TA1535; repair test in *Salmonella typhimurium* (strains TA1538 and TA1978); gene mutations in *Aspergillus nidulans*: 8-AG resistance and methionine suppression (*meth* A1 locus); lethal recessive damage in *Aspergillus nidulans*; unscheduled DNA synthesis (UDS) in human epithelial-like cells (EUE). Diquat and paraquat were positive in S. typhimurium (in the repair test and the 8-AG resistance system), in *A. nidulans* (for gene mutations and lethal recessive damage induction) and in EUE cells (UDS induction). (Author abstract by permission)

80-0491. Hedenstedt, A.; Rannug, U.; Ramel, C.; Wachtmeister, C. A. (Div. Toxicol. Genet., Environ. Toxicol. Unit, Wallenberg Lab., Univ. Stockholm, Stockholm S-10691, Sweden) **Mutagenicity and metabolism studies on 12 thiuram and dithiocarbamate compounds used as accelerators in the Swedish rubber industry.** *Mutat. Res.* 68(4): 313-325; 1979 (24 references).

Twelve thiuram and dithiocarbamate compounds used in the rubber industry as accelerators, and to some extent as sources of sulfur, were tested, as well as carbon disulfide, a metabolite found *in vivo* after dithiocarbamate treatment for mutagenicity in *Salmonella typhimurium*. A mutagenic effect on the base-substitution sensitive strains TA1535 and TA100 was found for 7 compounds. The most potent directly acting mutagens were: tetramethylthiuram disulfide (TMTD, thiram), zinc dimethyldithio carbamate (ziram), cadmium diethyldithio carbamate and zinc diethyldithio carbamate (ziram). Tetraethylthiuram disulfide (TETD, disulfiram) also known as Antabus, and carbon disulfide were non-mutagenic. The relatively low direct mutagenic effect of tetramethylthiuram monosulfide (TMTM) was enhanced in the presence of a metabolizing system (S9 mix). A hypothesis is given regarding the activation process of the monosulfide TMTM. (Author abstract by permission)

80-0492. Shahin, M. M.; Andrillon, P.; Goetz, N.; Bore, P.; Bugaut, A.; Kalopissis, G. (L'Oreal Res. Lab., F-93601 Aulnay-sous-Bois, France) **Studies on the mutagenicity of *p*- phenylenediamine in *Salmonella typhimurium*. Presence of PCB's in rat liver microsomal fraction induced by aroclor.** *Mutat. Res.* 68(4): 327-336; 1979 (23 references).

The mutagenicity of fresh solutions of *p*-phenylenediamine (PPD) and Aroclor 1254 were investigated. The histidine requiring strains of *Salmonella typhimurium* were used in the absence and presence of uninduced and/or Aroclor-induced rat-liver homogenate.

The presence of polychlorinated biphenyls (PCBs) was also examined by chromatographic methods in Aroclor-induced rat-liver homogenate. In the absence of metabolic activation, as well as in the presence of uninduced rat-liver homogenate, PPD was not mutagenic in the strains used. In the presence of Aroclor-induced S9 a twofold increase (or less) was observed in the number of revertant colonies over those of the controls in TA1538 and TA98. There was no increase in the number of revertant colonies over those of the controls when PPD was dissolved in NH_4OH solution and the solution mixed with H_2O_2 before the addition of S9 mix. Aroclor 1254 was not mutagenic in A1538 or TA98. However, the presence of PCBs in Aroclor-induced rat-liver homogenate (induced S9) was identified by gas-liquid chromatography (GLC), high-performance liquid chromatography (HPLC) and gas-liquid chromatography/mass spectrometry (GC/MS). (Author abstract by permission)

80-0493. NCI, Bethesda, MD 20014 **Bioassay of phosphamidon for possible carcinogenicity.** *NCI Tech. Rep. Ser.* 16: 98 pp.; 1979 (14 references).

Results of a bioassay on the possible carcinogenicity of technical grade phosphamidon using Osborne-Mendel rats and B6C3F1 mice are presented. In chronic feeding studies rats and mice were fed 80 or 160 ppm phosphamidon. Rats received the chemical for 80 wk, followed by an observation period of 30 or 31 wk; low-dose male mice were fed for 71 wk, then observed for 19 wk; high-dose male mice were fed for 62 wk, then observed for 28 wk; all female mice were fed for 80 wk, then observed for 10 or 11 wk. All surviving rats were killed at 110 or 111 wk, and all surviving mice at 90 or 91 wk. Animals were palpated for masses at regular intervals, and pathological examination of tissues was carried out at necropsy. In mice, there was no increase in the incidence of tumors in dosed animals compared with controls. In male rats, the combined incidence of hemangiomas and hemangiosarcomas in the spleen showed a statistically significant dose-related trend, but this was not significant in comparison with matched controls. In female rats, the Cochran-Armitage test for dose-related trend was significant for C-cell adenomas and carcinomas of the thyroid when pooled controls were compared with the dosed groups. However, in comparison with historical records of the laboratory, this data is shown to be marginal and insufficient to establish an association between tumors and phosphamidon administration. It is concluded that phosphamidon is not carcinogenic in the mice studied, and the data is insufficient to indicate carcinogenicity in Osborne-Mendel rats.

80-0494. NCI, Bethesda, MD 20014 **Bioassay of azinphosmethyl for possible carcinogenicity.** *NCI Tech. Rep. Ser.* 69: 126 pp.; 1978 (18 references).

Results of a bioassay of technical grade azinphosmethyl using Osborne-Mendel rats and B6C3F1 mice are presented. In chronic feeding studies, rats were treated with azinphosmethyl for 80 wk, with doses of 62.5 and 125 ppm for females, and time-weighted average doses of 78 or 156 ppm for males, followed by an observation period of 34 or 35 wk. Mice were fed azinphosmethyl for 80 wk at doses of 31.3 or 62.5 ppm for males and 62.5 or 125 ppm for females, followed by an observation period of 12 or 13 wk. Animals were palpated frequently for masses, and at necropsy tissues were examined pathologically. There were no increased incidences of tumors that could be related to azinphosmethyl administration in mice of either sex. In rats, there was an increase in tumors of the adrenal in dosed males and females, the follicular cells of the thyroid in dosed females, the anterior pituitary in dosed males, and the parathyroid in dosed males, but they were not considered to be related to the azinphosmethyl treatment. An increased incidence of tumors of the pancreatic islets and of the follicular cells of the thyroid in male rats suggests, but does not clearly implicate, azinphosmethyl as a carcinogen in rats. It is concluded that azinphosmethyl was not shown to be carcinogenic in female Osborne-Mendel rats or male or female B6C3F1 mice, and that the results do not provide sufficient evidence for its carcinogenicity in male rats.

80-0495. NCI, Bethesda, MD 20014 **Bioassay of parathion for possible carcinogenicity.** *NCI Tech. Rep. Ser.* 70: 104 pp.; 1979 (19 references).

Results of a bioassay of technical grade parathion using Osborne-Mendel rats and B6C3F1 mice are presented. In chronic feeding studies, male rats were given time-weighted average doses of 32 or 63 ppm and females were given 23 or 45 ppm for 80 wk, followed by an observation period of 32 or 33 wk. All surviving rats were killed at 112 or 113 wk. Mice were fed 80 or 160 ppm parathion, with low-dose males being treated for 71 wk; high-dose males for 62 wk; and all females for 80 wk. All surviving mice were killed at 89 or 90 wk. In mice, tumor incidences were not significantly higher in dosed groups than in corresponding control groups. In male and female rats, there was a higher incidence of cortical tumors of the adrenal in dosed rats compared with pooled or historical controls, suggesting that parathion is carcinogenic to this strain of rat.

80-0496. NCI, Bethesda, MD 20014 **Bioassay of formulated fenaminosulf for possible carcinogenicity.** *NCI Tech. Rep. Ser.* 101: 50 pp.; 1978.

Fifty male B6C3F1 mice and 50 Fischer 344 rats of each sex were maintained on diets containing either a low or high level of fenaminosulf for 78 wk. The low dietary concentrations were 0.01, 0.19, and 0.10% fenaminosulf for rats, male mice, and female mice, respectively, and the high levels of fenaminosulf in the diets for these groups,

respectively were 0.05, 0.10 and 0.05%. After the 78-wk period, rats were observed for 31 wk and mice for 19 wk. No associations were found between fenaminosulf dosing and mortality rate in male or female rats. Both male and female mice showed a significant positive correlation between dosage and mortality. No statistically significant relationship was found between the development of neoplasms in either sex or species and the administration of fenaminosulf. However, the treated animals did display an increased incidence of necrosis and mineralization of the tubular cells of the renal papilla. It was concluded that fenaminosulf was not carcinogenic in either B6C3F1 mice or Fischer 344 rats under the bioassay conditions used.

80-0497. NCI, Bethesda, MD 20014 **Bioassay of sulfallate for possible carcinogenicity.** *NCI Tech. Rep. Ser.* 115: 60 pp.; 1978.

Groups of 50 Osborne-Mendel rats, and B6C3F1 mice of each sex were administered dietary doses of sulfallate for 76 wk. The time-weighted average high and low oral concentrations of the chemical were, respectively, 410 and 250 ppm for male rats, 404 and 250 ppm for female rats, 1897 and 949 ppm for male mice, and 1815 and 908 ppm for female mice. There were significant positive correlations between increased sulfallate concentrations and accelerated mortality in both sexes of rats ($p < 0.001$, Tarone test), and female mice ($p < 0.001$). All animals exhibited distinct dose-related mean body weight depression, accompanied by clinical signs involving eyes, respiration, and appearance. Statistically significant correlation between dosage and incidences of mammary adenocarcinomas of female rats and mice ($p = 0.001$, Cochran- Armitage test), C-cell ($p = 0.034$) or stomach cancer ($p = 0.03$) in male rats, and in combined alveolar/bronchial carcinomas and adenomas in male mice ($p = 0.004$) were noted. Under the conditions of this bioassay sulfallate was carcinogenic to the test animals.

80-0498. NCI, Bethesda MD 20014 **Bioassay of piperonuyl sulfoxide for possible carcinogenicity.** *NCI Tech. Rep. Ser.* 124: 113 pp.; 1979.

Piperonyl sulfoxide was administered in a bioassay for carcinogenicity to 50 male and 50 female Fischer rats and 50 male and 50 female B6C3F1 mice for 105 wk. The compound was given via the diet to the experimental groups at 1,500 or 3,000 ppm for males and at 3,000 or 6,000 ppm for females. Groups of 50 male mice were given either 350 or 700 ppm piperonyl sulfoxide for 104 or 105 wk and groups of 50 female mice were fed 700 or 1,400 ppm of the compound. After the 20th wk, the doses given to female mice were lowered to 200 and 600 ppm, and the lower test doses were administered for an additional 84 or 85 wk. Decreased body weights occurred in all groups of animals treated with piperonyl sulfoxide. No significant increase in the incidence of tumor development was found in male or female rats, or in female mice given piperonyl sulfoxide. However, in male mice, an increased incidence of heptatocellular carcinomas was observed that was dose dependent. Under the conditions of the bioassay, it was concluded that piperonyl sulfoxide is carcinogenic to male B6C3F1 mice.

80-0499. NCI, Bethesda, MD 20014 **Bioassay of aldicarb for possible carcinogenicity.** *NCI Tech. Rep. Ser.* 136: 106 pp.; 1979.

In a bioassay for carcinogenicity, groups of 50 F344 rats and B6C3F1 mice of either sex were administered 2 or 6 ppm of aldicarb via the diet for 103 wk. Surviving animals were observed up to 2 wk after the end of aldicarb feeding and were then sacrificed for histological examinations. No differences in mortality rate or mean body weight were observed between control and treated animals of either sex or either species. Upon histological examination, a significantly increased incidence in the development of tumors in the treated animals was found. However, since mortality rate and body weight maintenance seemed to indicate the maximum tolerable dose levels of aldicarb were not used, it was concluded that the assessment of the potential carcinogenicity of aldicarb was not possible under the conditions of this bioassay.

80-0500. NCI, Bethesda, MD 20014 **Bioassay of diazinon for possible carcinogenicity.** *NCI Tech. Rep. Ser.* 137: 96 pp.; 1979.

Groups of 50 F344 male or female rats were administered chronic dietary doses of 400 (low dose) or 800 (high dose) ppm diazinon and groups of 50 B6C3F1 hybrid mice were fed 100 or 200 ppm daily doses for 103 wk. Diazinon had no significant effect on mean body weights or on longevity in either species; survival rates were 84-94% in all dosed and control groups at wk 78. Histopathologic examination on rat tissues provided no significant statistical evidence for carcinogenicity of diazinon, although leukemia or lymphoma, and endometrial stromal polyps were somewhat increased in all low- and high-dosed groups. Among mice, hepatocellular carcinomas or adenomas were seen in 24% of control, 43% of low-dose, and 27% of high-dose male animals. A variety of non-neoplastic lesions were seen among all mice, and none appeared to be related to administration of the test chemical. Diazinon was judged not to be carcinogenic for rats and mice in this bioassay.

80-0501. NCI, Bethesda, MD 20014 **Bioassay of nithiazide for possible carcinogenicity.** *NCI Tech. Rep. Ser.* 146: 46 pp.; 1979.

Groups of 50 Fishcer 344 rats of each sex were administered chronic doses of 625 ppm (low dose) or 1250

ppm (high dose) of nithiazide; groups of 50 male or female B6C3F1 mice were fed 2500 or 5000 ppm of the test substance for 56 wk and, after a 9-wk hiatus, for 33 additional weeks. There were no significant positive correlations between dosage and mortality of any of the groups tested. For both male and female rats and mice there was a slight, but distinct, dose-related mean body weight depression. For female rats the Cochran-Armitage test indicated a significant positive correlation between dosage and incidence of fibroadenomas and cystadenomas NOS of the skin, subcutaneous tissue, and mammary gland ($P = 0.003$), and endometrial stromal polyps of the uterus ($P = 0.039$). For male mice a significant positive correlation ($P = 0.002$) between dosage and the combined incidence of hepatocellular carcinomas or adenomas was noted. The Fischer exact test comparing high dose groups to controls was also significant ($P = 0.005$). Based on these results nithiazide was found to be carcinogenic in female rats, and high-dosed male and female mice. The compound was not found to be carcinogenic in male rats under the conditions of the bioassay.

80-0502. NCI, Bethesda, MD 20014 **Bioassay of methyl parathion for possible carcinogenicity.** *NCI Tech. Rep. Ser.* 157: 112 pp.; 1979.

Groups of 50 male or female Fischer 344 rats were administered dietary doses of 20 or 40 ppm methyl parathion for 105 wk. Groups of 50 B6C3F1 female mice were fed 62.5 or 125 ppm of the test chemical for 102 wk. Male mice were initially exposed to the same dosage as females; however due to lack of weight gain, high and low dosages were reduced to 50 and 20 ppm, respectively, after wk 37. Mean body weights of dosed male and female rats and mice were lower than those of controls in a dose-related manner. Survival rates of female rats were significantly affected; only 46% of the high-dosed females were alive at the termination of the study. No tumors occurred in any groups of mice or rats at significantly higher rates than in corresponding controls, leading to the conclusion that methyl parathion was not carcinogenic under the conditions of this study.

80-0503. Tomatis, L. (IARC, F-69372 Lyon Cedex 2, France) **Prenatal exposure to chemical carcinogens and its effect on subsequent generations.** *Natl. Cancer Inst. Monogr.* (51): 159-184; 1979 (98 references).

A review of data concerning prenatal exposure to chemical carcinogens is presented. Thirty-eight chemicals which are known to induce tumors following prenatal exposure are listed, and results from studies on mice and rodents are presented in table form. Studies with 7,12-dimethylbenz(a) anthracene (DMBA) in mice and with methylnitrosurea and ethylnitrosourea in rats indicated that exposure during pregnancy resulted in a high incidence of tumors in animals of the first generation, and in an increased incidence of tumors at specific sites in untreated animals of the second and third generations. Other results indicated that adminstration of DDT for 5 consecutive generations did not result in a progressively increasing incidence of tumors.

80-0504. Vesselinovitch, S. D.; Rao, K. V. N.; Mihailovich, N. (Dep. Radiol. & Pathol., Pritzker Sch. Med., Univ. Chicago, Chicago, IL 60637) **Neoplastic response of mouse tissues during perinatal age periods and its significance in chemical carcinogenesis.** *Natl. Cancer Inst. Monogr.* (51): 239-250; 1979 (84 references).

A review is presented in which perinatal carcinogenesis is discussed. Studies in which mice were exposed to a single dose of ethylnitrosourea (ENU) or doses of diethylnitrosamine (DEN), benzo(a)pyrene, aflatoxin B_1, benzidine 2HC1, DDT, dieldrin and safrole at specific age periods are discussed. The studies were all performed to determine a sensitive biologic model for carcinogenic screening. Various factors were found to play a role in the modification of carcinogenicity. The age of the animal at the time of exposure, with infants being the most susceptible, was the largest factor. Enzymatic competence to activate and metabolize the agent was another important factor. Perinatal and/or postnatal treatment accompanied by life-long exposures to test agents was a more sensitive bioassay than was post-weaning treatment.

80-0505. Quarles, J. M.; Sega, M. W.; Schenley, C. K.; Tennant, R. W. (Dep. Med. Microbiol. & Immunol., Coll. Med., Texas A&M Univ., College Station, TX 77843) **Rapid screening for chemical carcinogens; transforming activity of selected nitroso compounds detected in a transplacental host- mediated culture system.** *Natl. Cancer Inst. Monogr.* (51): 257-263; 1979 (9 references).

Studies were performed to determine rapid screening methods for chemical carcinogens. Hamsters were injected with carbaryl, methomyl, landrin, their *N*-nitroso derivatives and other chemicals ip on the 10th day of gestation, and embryo cell cultures were prepared on the 13th day. Cultures were subcultured 10 times, then scored for transformants. Diethylnitrosamine caused the most transformations (2.2%). Phenanthrene, carbaryl, and methomyl caused no transformations. Other compounds that had fairly high transformation rates were benzopyrene (2.0%), nitrosocarbaryl (1.8%), and nitrosomethomyl (1.7%). Although this method is accurate, it is technically demanding and requires careful attention to detail.

80-0506. Braun, A. G.; Emerson, D. J.; Nichinson, B. B. (Dep. Radiat. Ther., Med. Sch., Harvard Univ., Boston, MA 02115) **Teratogenic drugs inhibit tumour cell attachment to lectin-coated surfaces.** *Nature (London)* 282(5738): 507-509; 1979 (25 references).

Specific interactions between embryonic cells have been demonstrated in several *in vitro* systems. Many investigators have described homotypic aggregation of chick embryo cells, and heterotypic specificity has also been described. Because of the importance of morphogenic cell-cell interactions in development it follows that agents that interfere with these interactions, regardless of the interference mechanism, are potential teratogens. Here we have used a simple *in vitro* cell to surface recognition system in an attempt to screen for potential teratogens. We have found a very high correlation between inhibitory activity in the *in vitro* assay and reported teratogenic activity in human or animals studies. This suggests that many teratogenic agents may act by interfering, in an as yet unknown way, in normal cell to cell interactions. Among the 55 substances tested were warfarin, dinitrophenol, chloramphenicol, griseofulvin, and actinomycin D. (Author abstract by permission)

80-0507. Sitkiewicz, D.; Skonieczna, M.; Orlowska, E.; Bicz, W. (Dep. Drug Metab. Inst. Biopharm., Med. Acad., Warsaw, Poland) **The effect of organophosphorus insecticides on the oxidative process in rat brain mitochondria. Comparative studies of chlorfenvinphos and its chemical analogs.** *Neuropatol. Pol.* 16(4): 487-495; 1978 (19 references).

Mitochondria fractions were prepared from adult male albino rats. Chlorfenvinphos, IPO-62 and IPO-63 each affected respiration of rat brain mitochondria but the greatest inhibitor of state 3 respiration was chlorfenvinphos. While all 3 compounds contain the chlorinated aromatic ring, the second position of the vinyl group in chlorfenvinphos is probably responsible for the stronger inhibitory action.

80-0508. Konno, N. (Sch. Public Health, Fukushima Prefect. Med. Coll., Fukushima, Japan) **[Accumulation of the organophosphorus pesticide Phosvel in adipose tissue of hens and its delayed neurotoxicity.]** *Nippon Eiseigaku Zasshi (Jpn. J. Hyg.)* 34(4): 580-588; 1979 (23 references) (Japanese).

Purified Phosvel (leptophos) dissolved in salad oil was administered daily to 3 groups (12/group) of hens at a dose rate of 5, 10, or 20 mg/kg by stomach tube, and 3 hens/group were killed each wk. One hen from the 10 mg dose group and 2 hens from the 20 mg dose group died by paralysis during the experiment. Body weight of the 20 mg dose group showed a significant reduction. The concentration of leptophos in the adipose tissue of the hens in the 5 mg dose group was 0.94 ppm for 28 days. The leptophos concentration in the 10 mg dose group was 2.12, 2.37, 4,17 and 3.51 ppm, respectively for 7, 14, 21, and 28 days' administration, and in the 20 mg dose group, it was 3.22, 3.53, and 7.38 ppm for 7, 14, and 21 days, respectively. No motor disturbances were observed in the 5 mg dose group. Among the 10 mg dose group, some hens showed conspicuous paralysis. Except for one hen, all the birds of the 20 mg dose group showed gait disturbances after the 17th day.

80-0509. Kurisaki, E.; Sato, H. (Fukushima Prefect. Med. Coll., Fukushima, Japan) **[Toxicological studies on herbicides: intracorporeal distribution of paraquat dichloride and diquat dibromide in rat.]** *Nippon Hoigaku Zasshi (Jpn. J. Legal Med.)* 33(5): 656; 1979 (Japanese).

In spite of the similarity in chemical structure, paraquat has a more selective toxicity to the lung than diquat. The difference in their toxicities was examined in intracorporeal distribution of the 2 herbicides. Male Wistar rats were divided into 2 groups; paraquat and diquat were administered po to each group at a single dose of LD50 and 0.5 LD50, respectively. Animals were killed after 2, 24 and 48 hr (LD50 sub-group), and 2, 5 and 9 days (0.5 LD50 sub-group) after administration. The content of the herbicide in the brain, lung, heart, liver and kidney was determined. In the paraquat group of rats lung disturbance seemed to be the cause of death, however, without fibrotic change (due to early death). In the diquat group of rats no conspicuous changes were observed in the lung or in other organs. According to the analytical data of intracorporeal residue of the herbicides, it was found that paraquat persists in the body of the rat longer than diquat and that paraquat was strongly accumulated in the lung.

80-0510. Kawatomi, M.; Koga, H.; Yokoyama, K.; Fujimatsu, S.; Matsumoto, T.; Fukuda, H.; Ishizaki, T. (Dep. Intern. Med., Sasebo Munic. Gen. Hosp. Saseho, Nagasaki, Japan) **[A case of autopsy of a person who died of paraquat intoxication.]** *Nippon Naika Gakkai Zasshi (J. Jpn. Soc. Int. Med.)* 68(10): 1332-1333; 1979 (Japanese).

A case of a 51-yr-old male farmer who mistakenly drank 5 ml of 24% paraquat dichloride is described. Nausea and vomiting occurred 1-2 hr after uptake followed by upper abdominal pain and jaundice. When oliguria and raised BUN were observed, peritoneal perfusion was performed to improve the amount of urine. From the 10th hospital day, dyspnea and diffuse density in both lungs appeared. On the day 15 he died of respiratory failure. Findings upon autopsy included a strong image of interstitial pneumonia, stagnation of bile and cellular denaturation in the liver, denaturation of proximal tubules with interstitial edema in the kidney, infiltration of cells showing nonspecific acute renal failure, and a partial lack of the mucosal layer and inflammatory cellular infiltration of the esophagus. Although the acute renal failure could be treated, the specific, so-called "paraquat-lung" could not be prevented.

80-0511. Pimentel, J. C.; Menezes, A. P. (Inst. Pathol., Fac. Med., Univ. Lisbon, Lisbon, Portugal)

Granulomatous disease with alveolar cell carcinoma due to the inhalation of powdered DDT. *Pathology* 165(1-2): 140; 1979.

Rural and industrial workers had been exposed to DDT for periods ranging from 4 to 18 yr. These workers demonstrated a granulomatous disorder involving the lung and thoracic lymph nodes. Pulmonary findings included focal or diffuse thickening of the alveolar septa by proliferation of fibroblasts and histiocytes and the formation of collagen and reticulin fibers, plus histocytic granulomas. Lymph nodes demonstrated numerous epithelioid granulomas of the sarcoid type. DDT and its degradation products were identified in the lesions. Alveolar cell carcinomas was found in 5 cases where the lung lesions contained deposits of DDT. [Presented at the 7th European Congress of Pathology.]

80-0512. Zlateva, M.; Softova, E. (Dep. Pathol., Med. Acad., Sofia, Bulgaria) **The condition of lymph tissue in rats treated with pesticides.** *Pathology* 165(1-2): 183; 1979.

Sexually mature white rats were treated for 2, 3, 4, or 5 mo with organophosphate solutions of Zolon (phosalone) or Vophatox at dose levels of 0.002, 0.01, or 0.05 LD50. Rats treated for shorter periods of time demonstrated enlarged follicles. Increases were noted in the quantity of plasmatic cells and macrophages in the red pulp and medullar parts. In rats treated for longer periods of time follicular atrophy was noted in B- as well as in T-zones. A decrease in pyroniphyll cells was also noted. Changes in the microcirculation and permeability of the vessel walls of the lymph nodes and spleen were noted. Development of vascular and perivascular fibrosis was noted in the final stages. [Presented at the 7th European Congress of Pathology.]

80-0513. Bigley, W. S.; Vinson, S. B. (Dep. Entomol., Texas A & M Univ., College Station, TX 77843) **Degradation of ^{14}C methoprene in the imported fire ant, *Solenopsis invicta*.** *Pestic. Biochem. Physiol.* 10(1): 1-13; 1979 (10 references).

Studies on the degradation of ^{14}C-methoprene in the imported fire ant were carried out using late fourth-instar sexual form larvae, sexual-form pharate pupae, sexual-form pupae, and major workers. Insects were treated topically with ^{14}C-methoprene, after which insects parts were homogenized and extracted. Liquid scintillation counting and thin layer chromatography were carried out on the extracts and rinses. The following relative rates of absorption, metabolism and excretion were found: adults > larvae > pupae > pharate pupae. While metabolism by adults and pupae was primarily by *O*-demethylation to yield the alcohol-ester, methoprene was metabolized by larvae and pharate pupae principally by esterase cleavage of the isopropyl ester which yielded the ether-acid. It was observed that adults have a direct role in distributing methoprene and its metabolites, while the immature ants may serve as a reservoir for maintenance of effective levels of insect growth regulator and active metabolites in the colony.

80-0514. Bigley, W. S.; Vinson, S. B. (Entomol. Dep. Texas A & M Univ., College Station, TX 77843) **Effects of piperonyl butoxide and DEF on the metabolism of methoprene by the imported fire ant, *Solenopsis invicta* Buren.** *Pestic. Biochem. Physiol.* 10(1): 14-22; 1979 (17 references).

Radiolabeled methoprene (0.11 μg) alone and in combination with synergists piperonyl butoxide (PB) and *S,S,S*- tributyl phosphorotrithioate (DEF) were applied topically to adults, larvae, pharate pupae and pupae of the imported fire ant. Assays for metabolites of methoprene were performed after 18 hr. In adults, PB, a microsomal enzyme inhibitor, reduced methoprene metabolism. DEF, an esterase and microsomal oxidase inhibitor, was effective in reducing methoprene metabolism in larvae. Toxicity studies showed the alcohol-ester of DEF to be most toxic.

80-0515. Mangat, B. S. (Dep. Biol., Loyola Campus, Concordia Univ., Montreal, Quebec H4B 1R6, Canada) **The effect of diuron on the soluble nucleotide pool and growth of bean and corn seedlings.** *Pestic. Biochem. Physiol.* 10(3): 251-258; 1979 (28 references).

The ion-exchange and paper chromatographic analyses of bean and corn seedlings fed with 0, 50, 125, and 250 μM solutions of diuron showed that large numbers of nucleotide fractions were present in the plants. Adenine and uridine nucleotides predominanted over cytosine and guanine nucleotides in control plants with ATP and UDP-glucose being the most abundant. Seedlings exposed to 50 μM diuron exhibited a significant increase in ATP levels; this trend was reversed as diuron concentrations increased. Total nucleotide content in seedlings of both species fed 125 and 250 μM diuron decreased significantly, resulting in reduced metabolic activity, decreased fresh and dry weights, and reduced chlorophyll content.

80-0516. Malakondaiah, N.; Fang, S. C. (Dep. Agric. Chem., Oregon State Univ., Corvallis, OR 97331) **Differential effects of phenoxy herbicides on light-dependent $^{14}CO_2$ fixation in isolated cells of C_3 and C_4 plants.** *Pestic. Biochem. Physiol.* 10(3): 268-274; 1979 (13 references).

In order to study the effects of phenoxy herbicides (2,4-D, 2,4,5-T, and 2,4,6-T) on light-dependent $^{14}CO_2$ fixation and oxygen evolution, cells were isolated from the developing leaves of a C_3 plant water spinach (*Ipomoea aquatica*) and a C_4 plant crabgrass (*Digitaria sanguinalis*). Cell suspensions were exposed to herbicide concentrations

ranging from 2 x 10^{-7} *M* to 1 x 10^{-4}*M*. In *I. aquatica* cells, 2,4,5-T and 2,4-D caused a 20% stimulation of $^{14}CO_2$ fixation at 0.8 x 10^{-5}*M* and an inhibition at 1 x 10^{-4}*M*, with temperature having a marked influence. Little or no effect was observed in *D. sanguinalis* cells. In *I. aquatica* plants exposed to the nonactive 2,4,6-T, there was a stimulation of CO_2 fixation at low concentrations (as with 2,4-D and 2,4,5-T), but no inhibition at higher concentrations. None of the compounds caused stimulation in either photosystem I and II or photosystem II-mediated oxygen evolution. It is suggested that the increased CO_2 fixation caused by sublethal doses may be due to the stimulation of Calvin cycle enzymes in *I. aquatica*. At higher concentrations, the differential effects of 2,4-D and 2,4,5-T on light-induced CO_2 fixation and PSII-mediated oxygen evolution in the 2 plants may be due in part to their selective action against dicotyledonous plants.

80-0517. Blackman, R. L.; Devonshire, A. L. (Dep. Entomol., Br. Mus. (Nat. Hist.), London SW7 5BD, England) **Further studies on the genetics of the carboxylesterase regulatory system involved in resistance to organophosphorus insecticides in *Myzus persicae* (Sulzer).** *Pestic. Sci.* 9(6): 517-521; 1978 (9 references).

Levels of carboxylesterase activity in F_1 clones of *Myzus persicae*, obtained by crossing sexuales from a dimethoate resistant, high esterase clone with those from a susceptible, low esterase clone, fell into 2 distinct groups intermediate between the levels of carboxylesterase in the parent clones. When sexuales of F_1 clones of the lower of these 2 intermediate levels of carboxylesterase activity were crossed, segregation ratios in the F_2 generation indicated that this lower intermediate activity level (about 0.4 μmol/mg/hr), which is about twice the level in susceptible clones, is due to a mutation at a single regulatory locus. The results obtained with backcrosses, between sexuales of an F_1 clone having the higher intermediate level of carboxylesterase activity and a parent susceptible, low esterase clone, suggest that a second locus may be involved in the expression of higher level of esterase activity. (Author abstract by permission)

80-0518. Niessen, H. J. (Bayer AG, Pflanzenschutz A, Biol. Forsch., Bayerwerk, BRD) **Relationships between acidity/alkalinity and pH and their importance to pesticide specifications.** *Pestic. Sci.* 9(6): 603-609; 1978 (4 references).

In current national and international specifications, acidity and alkalinity on the 1 hand and pH on the other, are being used as quality criteria for pesticides. These 2 criteria are by no means interchangeable and the choice must be made on the product-specific basis. The experimental results clearly show that acidity limits are suitable quality criteria for active ingredients that form acidic decomposition products, and for their emulsifiable concentrates. For powder formulations the nature of the fillers used may seriously influence acidity figures, so that their value may be questionable. It is suggested that acidity limits be deleted for neutral active ingredients which do not form acid decomposition products. A suitable quality criterion for aqueous salt solutions of, for example, phenoxyalkanoic acids, is pH but it may also be used where active ingredients are known to decompose in certain pH ranges. (Author abstract by permission)

80-0519. McDonald, A. E.; Wood, R. J. (Dep. Zool., Manchester Univ., Manchester M13 9PL, England) **Mechanisms of DDT resistance in larvae of the mosquito *Aedes aegypti* L.** *Pestic. Sci.* 10(5): 375-382; 1979 (24 references).

Larvae of 8 strains of *Aedes aegypti* were exposed to DDT and compared for resistance, DDT uptake, *in vivo* breakdown of DDT and residual unmetabolized DDT. Resistance varied widely between strains, 3 being fully susceptible, 2 almost immune and 3 of intermediate resistance. Breakdown of DDT by dehydrochlorination to 1,1-dichloro- 2,2-bis (4-chlorophenyl) ethylene (*p,p′*-DDE) occurred in all strains and was greater in the 5 resistant types, but there was no significant correlation between the extent of breakdown in the resistant strains and the level of resistance. Moreover the overall difference between susceptible and resistant strains disappeared when they were compared at a low, almost sublethal, concentration of DDT. Larvae of resistant strains carried a greater absolute quantity of unmetabolized DDT in the body and were able to tolerate levels of DDT that were lethal to susceptible larvae. However the 2 most resistant strains (T8 and B51) contained significantly less DDT plus *p,p′*-DDE than strains of intermediate resistance (T30 and BSJ) from which they had been derived. Addition of the synergist chlorfenethol to DDT increased its knockdown effect on all resistant strains, suggesting that dehydrochlorination was a factor in resistance. Three strains, 2 DDT-resistant and 1 DDT-susceptible, were tested with 1,1-bis (4-ethoxyphenyl)- 2,2-dimethylpropane (I), an insecticide that cannot be dehydrochlorinated. All the strains were relatively tolerant to it although the DDT-susceptible strains were less tolerant. Addition of the synergist sesamex decreased the level of tolerance to I in all strains which suggested that microsomal oxidation made some contribution to it. It is concluded that 3 factors contribute to larval DDT resistance in *A. aegypti*: (a) increased metabolism to *p,p′*-DDE; (b) increased tolerance to unmetabolised internal DDT; and (c) reduced content of DDT + *p,p′*-DDE (only in the most resistant strains and due either to reduced absorption or increased excretion). These factors are discussed in relation to known larval resistance genes *RDDT1* and *y*. (Author abstract by permission)

80-0520. McDonald, A. E.; Wood, R. J. (Manchester Grammar Sch., Manchester M13 9PL, England)

Mechanism of DDT resistance in larvae of the mosquito *Aedes aegypti* L.; the effect of DDT selection. *Pestic. Sci.* 10(5): 383-388; 1979 (2 references).

Selection with *p,p'*-DDT was applied to fourth-stage larvae of *Aedes aegypti* along 4 lines, starting with larva of the F_2 generation from crosses between a susceptible strain and each of 4 resistant strains (2 of Trinidad origin and 2 of Bangkok origin). Larval resistance increased substantially along each line but there was little or no change in the percentage breakdown of DDT to 1,1-dichloro- 2,2-bis (4-chlorophenyl) ethylene (*p,p'*-DDE) *in vivo* and in no line were these 2 variables significantly correlated. Percentage breakdown was generally higher at 10 mg than at 50 mg. DDT uptake (defined as content of DDT + *p,p'*-DDE) was generally higher after exposure to 50 mg than to 10 mg. It increased significantly with selection in the TE x NS line; it remained unchanged in the T8 x NS line; and in the other 2 lines (BSJ x NS and B51 X NS), it increased initially but dropped as selection progressed, the reduction being highly significant in the second of these lines. The amount of internal residual (unmetabolised) DDT tolerated by larvae of the TE x NS line also increased significantly with resistance. The levels in the other lines followed the pattern of uptake, remaining steady in T8 x NS despite the increase in survival, rising at first and then declining in the 2 Bangkok lines. Thus selection produced a higher tolerance to internal unmetabolised DDT in the 2 Trinidad lines but led ultimately to a lower content of DDT + *p,p'*-DDE in the 2 Bangkok lines. The reasons for this behavior are discussed. (Author abstract by permission)

80-0521. Georgopoulos, S. G.; Sarris, M.; Ziogas, B. N. (Dep. Plant Pathol., Coll. Agric., GR-301 Athens, Greece) **Mitotic instability in *Aspergillus nidulans* caused by the fungicides iprodione, procymidone and vinclozolin.** *Pestic. Sci.* 10(5): 389-392; 1979 (17 references).

The fungicides iprodione, procymidone and vinclozolin were found to increase greatly the frequency of mitotic recombination in diploid colonies of *Aspergillus nidulans*. Although generally more potent, these fungicides do not appear to differ in their activity from members of a previously suggested aromatic hydrocarbon group with which they should be classified in this context. (Author abstract by permission)

80-0522. Patil, V. L.; Guthrie, F. E. (Toxicol. Program, Dep. Entomol., North Carolina State Univ., Raleigh, NC 27650) **Cuticular lipids of two resistant and a susceptible strain of houseflies.** *Pestic. Sci.* 10(5): 399-406; 1979 (26 references).

A study was made of the composition of the cuticular lipids of 2 resistant strains of houseflies (Rutgers and Fc), both of which show a reduced rate of absorption of insecticides as a partial mechanism of resistance and a susceptible strain (CSMA). Total lipids, monoglycerides, diglycerides and sterol esters (except in the Fc strain), sterols, fatty acids and phospholipid phosphorus were higher in resistant strains than in the susceptible strain. Phosphatidyl ethanolamine and phosphatidyl choline were major constituents of the phospholipid fractions and were appreciably higher in the resistant strains. Cuticular wax contents did not differ among strains. Incorporation of lipid precursors, [U-^{14}C] acetate and [^{32}P] orthophosphate, was greater in the cuticle on 1 or both resistant strains, depending on the lipid component examined. (Author abstract by permission)

80-0523. Osborne, M. P.; Hart, R. J. (Dep. Physiol., Univ. Birmingham, Birmingham B15 2TJ, England) **Neurophysiological studies of the effects of permethrin upon pyrethroid resistant (kdr) and susceptible strains of dipteran larvae.** *Pestic. Sci.* 10(5): 407-413; 1979 (17 references).

Permethrin at concentrations as high as 10^{-6} *M* had no detectable effect upon neuromuscular transmission at 20-21°C in the body-wall muscles of susceptible larvae of *Lucilia sericata* and susceptible and resistant (kdr) strains of larvae of *Musca domestica*. At the higher concentrations of 5 x 10^{-6} *M*, muscle cells in all strains and species of larva were slowly depolarised, resulting in failure of neuromuscular transmission when the level of depolarisation corresponded with the peak height of the postsynaptic potentials. Multiple postsynaptic potentials were sometimes obtained in response to a single electric stimulus to the motor axon. Neither of these effects is considered to result from interference with release of the neurotransmitter or its binding to the postsynaptic receptors. Spontaneous activity in sensory nerve fibers from susceptible larvae was increased followed by intermittent bursting and block at concentrations of permethrin as low as 10^{-9} *M* at 20-21°C and 10^{-10} *M* at 26°C. Resistant larvae of *M. domestica* were 1000 times less sensitive, needing concentrations of permethrin as high as 10^{-6} *M* at 20-21°C and 10^{-7} *M* at 26°C to affect sensory discharge. The results are discussed in relationship to the cause of knockdown by pyrethroid insecticides and to possible changes in the nervous system which may be brought about by the kdr resistance factor. (Author abstract by permission)

80-0524. Smith, P. J.; Crowe, A. J.; Das, V. G. K.; Duncan, J. (Int. Tin Res. Inst., Greenford, Middlesex UB6 7AQ, England) **Structure- activity relationships for some organotin molluscicides.** *Pestic. Sci.* 10(5): 419-422; 1979 (19 references).

Bioassay data are reported for 12 organotin compounds, R_3SnX, against the adult snail, *Biomphalaria glabrata*, an intermediate host of schistosomiasis. The relationship between the molluscidial activity and the nature of the R and X groups in the organotin compounds is discussed, as well as the possible mode of toxic action of these compounds. (Author abstract by permission)

80-0525. Daffalla, A. R.; Duncan, D.; Duncan, J. (Cent. Overseas Pest Res., London, W8 5SJ, England) **The relative susceptibility of two field collections of *Bulinus truncatus* (Audouin) to trifenmorph.** *Pestic. Sci.* 10(5): 423-428; 1979 (23 references).

Chemical control of the intermediate hosts of schistosomiasis, based on copper sulphate, has been practised in the Sudan Gezira since 1956. A continued use of the more recent trifenmorph blanket-treatments raises the question of eventual resistance to this molluscicide. Two collections of *Bulinus truncatus* (Audouin), from a treated and an untreated area of the Gezira, have therefore been subjected to laboratory rearing, bioassay and measurement of the rate of uptake of the chemical into the snail. A difference in susceptibility could be shown and this has been tentatively attributed to the rather more marked difference in penetration rate of the molluscicide between the 2 groups of snails. (Author abstract by permission)

80-0526. Clay, D. V.; McKone, C. E. (Agric. Res. Counc., Weed Res. Organ., Yarnton, Oxford OX5 1PF, England) **Effects of repeated applications at high rates of chlorthiamid and dichlobenil to blackcurrants.** *Pestic. Sci.* 10(5): 429-437; 1979 (26 references).

Chlorthiamid and dichlobenil were applied to blackcurrants each year for 5 years at doses up to 54 kg per ha. Growth and yield were not affected but leaf margin chlorosis was caused at the higher rates. No nitrile residues of dichlobenil or chlorthiamid were found in the fruit but 2,6-dichlorobenzamide (DCB) was present in most samples tested. There were no adverse effects of the treatments on the taste and flavour of the canned fruit. Nitrile residues in the soil were largely confined to the top 15 cm layer. Amounts detected 1 year after the previous application did not increase with repeated treatments and were always less than 10% of the annual doses. Nitrile residues were less from dichlobenil than chlorthiamid. The rate of disappearance of soil residues present at the end of the 5-year treatment period was much slower than that of the freshly applied herbicide. During the period of treatment there was generally less DCB than nitrile in the 0-15 cm layer but more was found in deeper layers and small amounts were detected at all depths sampled (up to 105 cm). These residues had largely disappeared 3.5 years after the final treatment. Test crops sown on the plots 2 years after the final treatment varied in susceptibility to the residues as follows; barley and cabbage (unaffected) < wheat < lettuce < carrot (most susceptible). In the following year only the treatments with chlorthiamid at 27 and 54 kg per ha caused a decrease in the growth of carrots but all the treatments caused skin abnormality. (Author abstract by permission)

80-0527. Agarwal, S. P.; Ahmad, A. (Dep. Physiol. & Pharmacol., Haryana Agric. Univ., Hissar 125004, India) **Effects of pesticides on reproduction in mammals.** *Pesticides* 12(4): 33-38; 1979 (71 references).

An estrogenic effect has been noted caused by DDT and some of its analogues which leads to an early opening of the vagina and constant estrus. Dose levels up to 200 ppm in the diet do not affect reproduction in rats and mice, whereas higher levels interfere not only with reproduction but also with the survival of the offspring. Dieldrin and aldrin are more toxic in this respect with 12.5 ppm dose levels leading to various reproductive disorders including reduced fertility and high mortality in pups. No adverse effect was noted from HCP (hexachlorophene) exposure except atrophic changes in seminiferous tubules of male rats when exposed to dose levels of 75 to 125 mg/kg. Reproduction in rats and mice was hindered after exposure to methoxychlor at concentrations of 1 to 3% or 2500 ppm. Kepone (chlordecone) and mirex were also harmful to reproduction at 7 ppm or 2 to 12 mg/kg/day.

80-0528. Ramanujam, T.; Nagarajan, M.; Sethuraman, S.; Pillaiyar, P. (Paddy Processing Res. Cent., Tiruvarur 610108, India) **Desiccation of paddy crop with gramoxone (paraquat) and reglone (diquat).** *Pesticides* 13(8): 40-44; 1979 (9 references).

To shorten the drying-out period of paddy crops, a study with the herbicides paraquat and diquat was undertaken. Paraquat, as Gramoxone, was sprayed on standing Adt. 31 and Co. 33 varieties of paddy in 0.05, 0.1, and 0.2% concentrations and the crops were harvested within 6, 12, 24, or 48 hr after spraying. Diquat, as reglone, was sprayed at the 0.1% level on the crop on the day 27 of 50% flowering. The 0.2% paraquat treatment hastened ripening by at least 7 days, accompanied by a 13% drop in straw moisture 24 hr after spraying. The 0.05 and 0.1% spray regime reduced straw moisture by 6.8 and 11.4%, respectively. Perceptible desiccating effects of diquat were also noted 48 hr after spraying. Herbicide residue levels in rice products were within acceptable tolerance levels.

80-0529. Malik, J. K.; Singh, R. C. P.; Roy, K. S.; Gupta, P.; Paul, B. S. (Dep. Pharmacol., Punjab Agric. Univ., Ludhiana, India) **Pesticides induced dermal changes in buffalo calves.** *Pesticides* 13(8): 45-48; 1979 (11 references).

Healthy male buffalo calves were treated with dermal applications of 0.5, 1.0, or 5% aqueous emulsions (EC) of malathion, fenitrothion, and DDT for 30 days. No deaths or overt signs of toxicity were observed among any of the animals, and no gross dermal changes were noted at any concentration. Histopathologic examinations revealed that the 0.5% concentrations of fenitrothion produced increased cellularity of the dermis; at 1 or 5% application rates all of the insecticides produced hyperplasia and hyper keratinization of the epidermis, and cellular infiltration in the upper layers of the dermis. The 1 or 5% doses of malathion and fenitrothion also caused increased epidermal pigmentation.

80-0530. Freund, J. L.; Gutmark, F.; Freund, D.; Kahlau, F.; Glanzmann, P. (Inst. Arbeitphysiol. & Rehabilitationsforsch., Philipps-Univ., D-3550 Marburg/Lahn, BRD) **TMB- and TMD-rats: influence of warfarin on the number of platelets.** *Pfluegers Arch.* 382(Suppl.): R22; 1979.

TMB (TRYON Maze-bright) and TMD (TRYON Maze-dull) rats were dosed with 3 mg warfarin/10 mg body weight. Warfarin increased the number of platelets, with the intelligence level showing no effect on the increase. There was a significantly higher number of platelets in TMD rats compared to TMB rats under resting conditions. Using a hypothetical relationship between the number of platelets and the amount of circulating and urinary catechols, it is suggested that a similar relationship under resting conditions occurs in emotive and non-emotive Wistar rats, indicating that different levels of intelligence and anxiety produce varying reactions to stress.

80-0531. Main, A. R. (Dep. Biochem., North Carolina State Univ., Raleigh, NC 27650) **Mode of action of anticholinesterases.** *Pharmacol. Ther. Part A* 6(3): 579-628; 1979 (114 references).

Organophosphate and carbamate insecticides achieve their effects primarily as nerve poisons by inhibiting cholinesterase (ChE) activity. In this review the classification and substrate specificities of various ChEs, the reactive sites of ChEs, and kinetics of inhibition by compounds such as paraoxon, malaoxon, DFP, amiton, parathion, TEPP, diazinon, fenthion, trichlorfon, fonofos, dimefox, carbaryl, aldicarb, carbofuran, pirimicarb, and mobam are discussed.

80-0532. Zsoldos, F.; Haunold, E. (Dep. Plant Physiol., Jozsef Attila Univ., H-6701 Szeged, Hungary) **Effects of pH changes on ion and 2,4-D uptake of wheat roots.** *Physiol. Plant* 47(2): 77-80; 1979 (21 references).

The relationships between pH-dependent ion and 2,4-D uptake in winter wheat seedlings were examined. Excised roots were grown at pH 4 in a 5×10^{-4} *M* $CaSO_4$ solution, followed by exposure to 0.01 m*M* ^{14}C 2,4-D solution at pH 4 or 6 for 3 hr. At pH 4 the 2,4-D uptake was much higher than at pH 6, thereby inhibiting the uptake of K, P, NH_4, or NO_3 ions, and increasing phytotoxicity to the plant. Simultaneously, the herbicide uptake stimulated the secretion of H^+ into the absorption solution, thus further lowering pH values. At pH 4 the influx of 2,4-D into the roots was 6 times higher than at pH 6. Parallel growth studies showed that a short (3 hr) incubation of wheat roots in the 0.01 m*M* 2,4-D solution caused marked growth inhibition only at pH 4. These results were in agreement with the 2,4-D influx data.

80-0533. Koukkari, W. L.; Johnson, M. A. (Dep. Bot., Univ. Minnesota, St. Paul, MN 55108) **Oscillations of leaves of *Abutilon theophrasti* (velvetleaf) and their sensitivity to bentazon in relation to low and high humidity.** *Physiol. Plant* 47(2): 158-162; 1979 (26 references).

Twenty μl of bentazon were applied to the leaves of young (3-leaf stage) velvetleaf plants in a series of 9 drops; 3 drops over the center midvein, and 1 drop each on the 6 largest veins. Under conditions of high relative humidity (RH) nearly all of the leaves were severely injured, regardless of the time of day that bentazon was applied. When the RH and soil moisture were low a pronounced oscillation in severity of leaf injury was observed for the 1st and 2nd leaves. The youngest leaves (no. 3) were exceptional in that injury occurred under both high and low RH conditions. In older leaves bentazon was most phytotoxic during the dark cycle, and least toxic during the middle of the light period. The youngest leaves generally did not exhibit such a pronounced daily oscillation.

80-0534. Arnold, D. L.; Grice, H. C. (Bur. Chem. Saf., Food Dir., Health Prot. Branch, Health & Welfare Canada, Ottawa, Ontario, Canada) **The use of the Syrian hamster in toxicology studies, with emphasis on carcinogenesis bioassay.** *Prog. Exp. Tumor Res.* 24: 222-234; 1979 (59 references).

The possible use of the Syrian hamster in toxicological evaluation programs is considered, including its use in short-term tests, long-term or cancer bioassay studies, and *in vitro* assay systems. The susceptibility of the species to carcinogenic chemicals is discussed. The review of the literature on this subject suggests that the Syrian hamster is a species which would provide a valuable asset for cancer bioassay work. A list of compounds which show species-related differences in carcinogenicity in hamsters, rats or mice is given. Among these compounds, DDT displayed variations in carcinogenic response among different species only in mice, while other of these compounds showed species variations in carcinogenic response in as many as 2 of the above mentioned rodent groups. It is suggested that most of the critics of the use of hamsters indicate a lack of understanding of the requirements of the species for general care and handling. Commercial inbred hamster lines relatively free of disease problems have been available for only the last few years, which may account for part of the lack of use of this species in such studies.

80-0535. Engler, R. (Off. Pestic. Programs, US EPA, Washington, DC) **Toxicity tests for the purpose of regulating pesticides.** *Prog. Exp. Tumor Res.* 24: 253-258; 1979 (3 references).

A review is presented on the use of hamsters in pesticide toxicity studies. The history of federal guidelines on toxicity tests is discussed as a rationale for testing requirements and species selection. The usefulness of hamsters for various tests is then described. Because of its size, the hamster would not be an alternative to the rat in

long term chronic feeding studies. Studies on baseline responses to disease and spontaneous tumor formation must be carried out on hamsters, after which they might lend themselves to oncogenic studies. The usefulness for short term experiments such as the effects of pesticides residues on tobacco, multigeneration reproduction studies, and teratogenicity are also discussed.

80-0536. Hammond, S. M. (Dep. Microbiol., Univ. Leeds, Leeds LS2 9JT, England) **Inhibitors of enzymes of microbial membranes; agents affecting Mg^{2+} activated adenosine triphosphatase.** *Prog. Med. Chem.* 16: 223-256; 1979 (320 references).

Organic compounds of tin have been used as fungicides and insecticides as well as in other areas of industry. Due to their phytotoxicity organotin compounds have not been used as agricultural insecticides or fungicides. They are equally inhibitory to the photosynthetic generation of ATP or oxidative phosphorylation in insect, fungi, and mammalian mitochondria. The extent of alkylation determines the fungicidal activity of the alkyltins, with this activity being greatest in the trialkylated compounds. Trialkyltins appear to be an uncoupler and also to possess specific inhibitory activity of coupled mitochondrial respiration and phosphorylation.

80-0537. Park, B. K.; Breckenridge, A. M.; Ohnhaus, E. E. (Dep. Pharmacol. Ther., Univ. Liverpool, Liverpool, England) **Modificazione dell'azione dei farmaci per inibizione del loro metabolismo. [Modification of the action of drugs by inhibition of their metabolism.]** *Recenti Prog. Med.* 67(3): 313-345; 1979 (152 references) (Italian).

Studies on enzyme induction and inhibition by drugs and other chemical substances are reviewed. The metabolism of warfarin is influenced by phenobarbitione and rifampicin. Phenylbutazone increases the elimination of S-warfarin in humans. Long-term administration of ethyl alcohol leads to an acceleration of the metabolism of warfarin. Increased urinary excretion of radiolabeled warfarin was observed in humans following the administration of antipyrine (600 mg for 3 days). The urinary excretion of D-glucaric acid is increased by DDT and endrin in humans. Similarly, the urinary excretion of 6-beta-hydroxycortisol is increased by DDT, DDD (TDE), and endrin.

80-0538. Yatsenko, V. G.; Skriabina, A. I. (All-Union Sci. Res. Inst. Sugar Beet, Kiev, USSR) **V Orlovskoy oblasti. [Effectiveness of herbicide mixtures in the Orlov Oblast.]** *Sakh. Svekla* (2): 25; 1979 (Russian).

The effectiveness of various herbicide combinations [eptam (EPTC; 4 kg/ha) + betanal (phenmediphan; 1 kg/ha), eptam (6 kg/ha) + betanal (1 kg/ha), pyramine (pyrazon; 6 kg/ha) + betanal (1 kg/ha), betanal (2x1 kg/ha), and betanal (1.5 kg/ha)] was studied in sugar beets. The treatment caused no significant change in the sugar content of the beets (18.1-18.5% in the controls versus 18.1-18.8% in the treated beets).

80-0539. Nooden, L. D.; Kahanak, G. M.; Okatan, Y. (Bot. Dep., Univ. Michigan, Ann Arbor, MI 48109) **Prevention of monocarpic senescence in soybeans with auxin and cytokinin: an antidote for self-destruction.** *Science* 206(4420): 841-843; 1979 (21 references).

A series of experiments were carried out on soybean plants in an attempt to determine whether certain chemicals can prevent the seed-induced degeneration (monocarpic senescence) which occurs during the final phases of fruit maturation. Foliar application of the cytokinin 6-benzyladenine (BA) was effective in preventing leaf yellowing, with less retardation of abscission. The auxin α-naphthaleneacetic acid (NAA) retarded leaf yellowing less, but abscission more. The combination of NAA plus BA essentially suppressed leaf yellowing and abscission, with no visible alterations in vegetative growth and no retardation of fruit development. In addition, the loss of starch and nitrogen that occurs during senescence of these leaves was prevented.

80-0540. Hansen, L. G.; Simon, J.; Dorn, S. B.; Teske, R. H. (Div. Pharmacol. & Toxicol., Coll. Vet. Med., Univ. Illinois, Urbana, IL 61801) **Hexachlorobenzene distribution in tissues of swine.** *Toxicol. Appl. Pharmacol.* 51(1): 1-7; 1979 (13 references).

Purified hexachlorobenzene (HCB) was administered to third-litter sows at dietary concentrations of 0, 1, or 20 ppm throughout gestation and nursing. Swine receiving 1 ppm were not adversely affected and residue concentrations in tissues other than fat and bone marrow remained at or below the dietary concentration. Residues of HCB in the dissectable fat of these pigs accumulated to concentrations five- to seven-fold higher than the dietary concentration. Piglets accumulated fat residues, through both placental transfer and nursing, that were higher than those of the sows. A similar proportional accumulation of HCB in fat occurred in sows receiving 20 ppm in the diet. Other toxic signs included neutrophilia, gastric irritation, fatty replacement of Brunner's gland, and pancreatic periductal fibrosis. Hepatotoxicity was not apparent, perhaps because of age-related changes in both control and treatment groups. (Author abstract by permission)

80-0541. Murray, F. J.; Staples, R. E.; Schwetz, B. A. (Toxicol. Res. Lab., Health & Environ. Sci., USA, Dow Chem., Midland, MI 48640) **Teratogenic potential of carbaryl given to rabbits and mice by gavage or by dietary inclusion.** *Toxicol. Appl. Pharmacol.* 51(1): 81-89; 1979 (19 references).

The teratogenic potential of the insecticide carbaryl (1-naphthyl methylcarbamate) was evaluated in New Zealand rabbits and CF-1 mice. Rabbits were given 150 or 200 mg carbaryl/kg/day by gavage from days 6 through 18 of gestation. Mice were given 100 or 150 mg carbaryl/kg/day by gavage or were given a diet containing 5660 ppm of carbaryl (1166 mg carbaryl/kg/body wt/day) from days 6 through 15 of gestation. An increased incidence of omphalocele was observed among the offspring of rabbits given 200 mg carbaryl/kg/day, which was a maternally toxic dose, and another case was observed among the offspring of rabbits given 150 mg/kg/day, a dosage which produced mild maternal toxicity. In comparison, carbaryl was not teratogenic in mice given maternally toxic doses of the compound either by gavage or by dietary inclusion. (Author abstract by permission)

80-0542. Eaton, D. L.; Klaassen, C. D. (Dep. Environ. Health, Univ. Washington, Seattle, WA 98195) **Effects of 2,3,7,8- tetrachloro dibenzo-*p*- dioxin, Kepone, and poly brominated biphenyls on transport systems in isolated rat hepatocytes.** *Toxicol. Appl. Pharmacol.* 51(1): 137-144; 1979 (28 references).

Adult male rats received intraperitoneal injections of 2,3,7,8- tetrachloro dibenzo-*p*- dioxin (TCDD, 10 μg/kg), polybrominated biphenyls (PBBs, 200 mg/kg), Kepone (chlordecone; 5 mg/kg/day for 5 days), or vehicle, and isolated hepatocytes were prepared 10, 3, or 1 day after injection of TCDD, PBBs, or Kepone, respectively. All treatments significantly increased the hepatic microsomal content of cytochrome P-450. The initial velocity of uptake (V_o; measured within the first 2 min), steady-state concentration (*SS*, measured over 1 hr) and an indirect estimate of an efflux rate constant, K_{ef}, were determined for ouabian and procaine amide ethobromide (PAEB). TCDD decreased V_o and *SS* of ouabian but no effect on K_{ef} for ouabain or any parameter of PAEB transport. PBBs tended to increase K_{ef} and significantly decreased *SS* of ouabian. The K_{ef} for PAEB was significantly increased, but V_o and *SS* were not changed in PBB-treated rats. Kepone had no effect on V_o of either substrate but signifiantly decreased *SS* and increased K_{ef} for ouabain. These data demonstrate that the ouabain transport system is selectively inhibited by TCDD and that PBBs may nonspecifically increase the rate of efflux of actively transported substrates from cell to medium. (Author abstract by permission)

80-0543. End, D. W.; Carchman, R. A.; Ameen, R.; Dewey, W. L. (Dep. Pharmacol., Med. Coll. Virginia, Richmond, VA 23298) **Inhibition of rat brain mitochondrial calcium transport by chlordecone.** *Toxicol. Appl. Pharmacol.* 51(1): 189-196; 1979 (24 references).

Assessment of $^{45}Ca^{2+}$ transport in rat brain mitochondria following *in vitro* and *in vivo* exposures to the neurotoxic insecticide chlordecone revealed a locus for chlordecone's mitochondrial impairment in the coupling reactions of oxidative phosphorylation. Mitochondrial $^{45}Ca^{2+}$ transport supported by either 2 m*M* succinate (free energy supplied via electron transport) or 800 μ*M* ATP (free energy supplied via the Mg^{2+} ATPase reaction) was inhibited by low concentrations of chlordecone (10^{-8}-10^{-5} *M*). Administration of a tremorigenic dose (40 mg/kg, po) of chlordecone to rats similarly inhibited both succinate- and ATP-supported $^{45}Ca^{2+}$ uptake in brain mitochondria *in vitro*. Studies on the subcellular distribution of ^{14}C chlordecone in rat brain following *in vivo* administrations were compared to those on the mitochondrial uptake of ^{14}C chlordecone *in vitro*. Administration of the 40-mg/kg tremorigenic dose of chlordecone produced mitochondrial chlordecone concentrations which were comparable to the tissue concentractions achieved by exposing mitochondria to a 2×10^{-6} *M* concentration of chlordecone *in vitro*. These data lend further support for mitochondrial inhibition as a mechanism for chlordecone toxicity. (Author abstract by permission)

80-0544. Curtis, L. R.; Williams, W. L.; Mehendale, H. M. (Dep. Pharmacol. & Toxicol., Univ. Mississippi Med. Cent., Jackson, MS 39216) **Potentiation of the hepatotoxicity of carbon tetrachloride following preexposure to chlordecone (Kepone) in the male rat.** *Toxicol. Appl. Pharmacol.* 51(2): 283-293; 1979 (29 references).

The effect of carbon tetrachloride (CCl_4) challenge on several parameters of hepatic injury was determined in chlordecone (CD)-pretreated male rats. Following a 15-day feeding of 0 or 10 ppm CD, rats received a single intraperitoneal challenge of 0, 25, 50, 100, or 200 μl CCl_4/kg. Twenty-four hours after CCl_4, biliary excretion of phenolphthalein glucuronide (PG), bile secretion, and serum transaminase (SGPT, SGOT) activities were examined as functional indices of hepatic injury. Feeding of 10 ppm CD alone resulted in decreased biliary excretion of PG (59% of control) but had no effect on bile flow or on serum transaminases. Twenty-four hours after CCl_4 alone, the 2 high doses caused decreased biliary excretion of PG in the absence of any effect on bile flow and doubled serum transaminases at the highest dose (200 μl/kg). A single challenge of CCl_4 to CD-fed rats resulted in a dose-dependent impairment of PG excretion at a dose of 50 μl/kg and higher. Bile secretory function was severely impaired in the CD-fed animals receiving CCl_4 at the doses of 100 and 200 μl/kg. Decreased bile flow was not seen in any other groups. Greatly potentiated hepatotoxicity was reflected in the form of elevated SGPT and SGOT activities which increased in excess of 30- and 10-fold, respectively, in CD-fed rats challenged with CCl_4 at 100 and 200 μl/kg. Parenchymal liposis (cytoplasmic sudanophilic droplets) developed in all CD-fed rats receiving CCl_4, while necrosis occurred after CCl_4 at 50 μl/kg and increased in a dose-dependent manner. CCl_4 controls exhibited parenchymal liposis and limited centrilobular necrosis only at the 2 highest doses of CCl_4. These data indicate a great potential

for production of severe liver damage resulting from interactions of CCl_4 and CD exposure at levels which may be independently nontoxic. (Author abstract by permission)

80-0545. Abou-Donia, M. B. (Dep. Pharmacol., Duke Univ. Med. Cent., Durham, NC 27710) **Pharmacokinetics and metabolism of a topically applied dose of *O*-4- bromo-2,5-dichlorophenyl *O*-methyl phenyl phosphonothioate in hens.** *Toxicol. Appl. Pharmacol.* 51(2): 311-328; 1979 (39 references).

Investigations into the pharmacokinetics and metabolism of a topically applied 50 mg/kg dose of ^{14}C-labeled leptophos (*O*-4-bromo- 2,5-dichlorophenyl *O*-methyl ^{14}C phenylphosphono thioate) on the comb of hens are reported. A total of 35.4% of the applied dose was absorbed through the skin during the 20-day experiment. Combined urinary-fecal excreta accounted for most of the radioactivity (24.3% of the applied dose). Significant amounts of the dose were deposited in egg albumen and yolk: 2.5 and 2.0%, respectively. Only 1.3% was excreted in expired CO_2. Radioactivity in tissues reached a peak of 17.1% of the dose 12 hr after administration; radioactivity decreased to 5.0% after 20 days (29.4% of peak value). Highest ^{14}C content was present in the muscle, followed by the skin, adipose tissue, and the liver. Central and peripheral nerve tissue was shown throughout the experiment to contain small constant amounts of ^{14}C. The change in the ^{14}C in the body with time showed a biphasic pattern. The half-life for the elimination of ^{14}C from the bird's body was 17.0 days corresponding to a rate value β of 0.04 per day. Most of the radioactive substances in the excreta and liver were identified as unchanged leptophos with minor amounts of polar metabolites. The fate of leptophos was rationalized on the basis of its physical properties, i.e., lipid solubility and tissue binding, and predominant biliary secretion and gastrointestinal excretion. (Author abstract by permission)

80-0546. Gupta, P. K.; Gupta, R. C. (Indust. Toxicol. Res. Cent., Lucknow 226001, India) **Pharmacology, toxicology and degradation of endosulfan. A review.** *Toxicology* 13(2): 115-130; 1979 (98 references).

The chemistry, toxicity to wildlife, degradation and metabolism by plants, and breakdown by physicochemical processes of endosulfan are reviewed. Oral LD50 values in laboratory animals range from 43 to 220 mg/kg body weight, while toxicity of endosulfan to wildlife ranges from 200-1,000 mg/kg in fowl. Endosulfan is effective against a wide range of insect pests, and under field conditions is a contact and residual poison. Plants are generally more tolerant of endosulfan than of other pesticides; hydrolysis on plant foliage to endosulfan diol or endosulfan sulfate is the general metabolic pathway. There is very little information available on substantial accumulation of the pesticide in animal or plant tissues, but endosulfan is rarely detected in crops intended for human consumption.

80-0547. Ecobichon, D. J.; Zelt, D. (Dep. Pharmacol. & Therap., McGill Univ., Montreal, Quebec H3G 1Y6, Canada) **The acute toxicity of fenitrothion in weanling rats and effects on tissue esterases and mono-oxygenases.** *Toxicology* 13(3): 287-296; 1979 (23 references).

Weanling male Wistar rats were administered 50 mg fenitrothion/kg body weight/day by oral gavage for 5 days. Overt signs of moderate toxicity were observed in many animals within 1 hr of the third dosing; by day 5 signs of severe toxicity (tremors and clonic convulsions) were apparent. Fenitrothion residues in livers and kidneys 24 hr after the third dose ranged from 0.03 to 1.54 $\mu g/g$, and 0.280 to 0.83 $\mu g/g$, respectively. Erythrocytic AChE, plasma PChE, and hepatic and renal aliesterase activities of rats surviving the treatment were markedly inhibited. Fenitrothion also caused a significant reduction in liver and body weights ($p < 0.05$), and in hepatic microsomal monooxygenase activities ($p < 0.005$). Recovery of all tissue esterases after the 5-day treatment regime was slow (20-50% of normal after 5 days), except for PChE which returned to 78% of control activity within 5 days.

80-0548. Mathur, D. S. (Zoolog. Surv. India, Jabalpur, India) **Histopathological changes in the liver of fish resulting from exposure to certain insecticides.** *Toxicon* 17(5): 118; 1979 (3 references).

Hypertrophy, necrosis and margination of hepatic cells were among the effects of long term exposure of *Channa punctatus* to DDT. Vacuolar degeneration of the cytoplasm of the cells was the chief lesion. When exposed to BHC necrosis was not noted. The chief alteration was also hypertrophy, necrosis and margination of hepatic cells in *Heteropneustes fossilis.* In *Colisa fasciatus* notation was made of a moderate degeneration in parenchymatous cells. Liver damage was noted by scattered distribution of hepatic cells. Vacuolar degeneration of the cytoplasm of cells was the major lesion. In *Puntius sophore* the infected liver cells were scattered and degeneration of the parenchymatous cells was marked.

80-0549. Zhavororkov, N. I. (All-Union Inst. Exp. Vet. Med., Moscow, USSR) **Otsenka deystviia pestitsidov na vosproizvoditel'nuiu funktsiiu zhivotnykh. [Assessment of the effect of pesticides on reproductive function of animals.]** *Veterinariya (Moscow)* (9): 67-69; 1979 (Russian).

The principles of the rapid testing of pesticides for gonadotoxicity, embryotoxicity, and teratogenicity are described, and results obtained by these methods are presented. The tests are carried out on hens and roosters fed doses 0.01 to 0.02 LD50, on male and female rabbits fed doses of 0.02 to 0.04 LD50, and in pigs fed doses of 0.01 to 0.02 LD50. The gonads of the males and the semen are examined for abnormal changes, some of the pregnant females are killed to determine the intrauterne mortality,

and the size of the litter and the parameters of the development of the offspring are analyzed. The investigation of carbamates according to this scheme demonstrated the marked embryotoxic, gonadotoxic, and teratogenic effects of TMTD (thiram) and zineb. TMTD, given to rabbits in a dose of 0.01 LD50, caused a reduction in the number of live fetuses to 60.5% of the control value on day 24 of pregnancy. The mean weight of the embryos was 77.3% of the control value. The average number of offspring was 5.35 versus 8.35 in the controls, and 9.4% of the offspring in the experimental group showed signs of malformations. Of the offsprng in the experimental group 76% died within 2 mo, and the body weight of the animals surviving for 4 mo was only 48.1% of that of the controls.

80-0550. Peshkova, G. P.; Stroev, E. A.; Mirolyubov, N. G. (Dep. Biochem., Ryazan Med. Inst., Ryazan, USSR) **Biologcheskaya tsennost' ozimoi pshenits'i mironovskaya-808, v'irashchennoi s primeneniem gerbitsida simazine. [Biological value of spring wheat Mironovskaya-808 grown with the use of the herbicide simazine.]** *Vopr. Pitan.* (5): 42-45; 1979 (12 references) (Russian).

Tests were carried out in spring wheat Mironovskaya-808 which was treated with simazine at doses of 0.5 and 1.0 kg/ha prior to appearance of shoots. Organoleptic and physiochemical parameters did not differ significantly from reference samples. In tests using *Tetrahymane pyriformis*, the relative biological value of wheat grown with 1.0 kg simazine/ha was slightly higher than the control. In tests using male rats, there were no adverse effects of simazine-treated wheat on parameters of protein metabolism (the content of protein and its fractions in blood serum, liver and brain as well as activity of enzymes participating in protein metabolism regulation).

80-0551. Bidnenko, L. I.; Boiko, G. I. (All-Union Res. Inst. Toxicol. Pestic. Polym. & Plast., Kiev, USSR) **Toksikologo-gigiencheskaya kharakteristika preparata nzrozrozin-sredstva zashchit'i rastenii i pochv, podverzhenn'ikh vetrovoi zrozii. [Toxicological and hygienic characteristics of nerosin, an agent protecting plants and soil against erosion.]** *Vopr. Pitan.* (5): 45-49; 1979 (17 references) (Russian).

Investigations were carried out on the antideflationary agent nerosin. In albino rats fed for 1 yr on bread prepared from spring wheat treated with nerosin there was no effect on the functional condition of the liver, the redox activity of the blood constituents catalase and peroxidase, or the morphological structure of the peripheral blood. There was an elevation of glucuronic acid metabolism, a significant increase in free and bound sulfates in the urine, and a change in the sulfate index, all suggestive of intensified physiological functional defense reactions.

80-0552. Bogatykh, T. A.; Orlov, N. V.; Kuznetsova, T. V. (Lab. Toxicol. Pestic., Inst. Nutr., Acad. Med. Sci. USSR, Moscow, USSR) **Aktivnost' izofermentov laktatdegidrogenza'i i glykozo-6- fosfatdegidrogenaz'i v tkanyakh semennikov kr'is pri vozdeistvii nekotor'ikh pestitsidov. [Activity of lactate dehydrogenase and glucose-6- phosphate dehydrogenase in tissue of the rat testes under the action of some pesticides.]** *Vopr. Pitan.* (5): 49-53; 1979 (15 references) (Russian).

Male Wistar rats were used to study the effects of the pesticides chlorophos (trichlorfon), methylnitrophos (fenitrothion) and cineb (zineb) on the LDH and G-6-PDH of testes tissues. It was demonstraed that treatment with chlorophos for 9 months at a dose of 1 mg/kg body weight resulted in substantial changes in the activity of LDH and G-6-PDH isoenzymes. However, treatment with methylnitrophos (0.5 mg/kg) or cineb (2.5 mg/kg) caused no significant changes. The same doses of the 3 pesticides for 3 months did not have a significant effect of LDH and G-6-PDH isoenzyme fraction activities, or their isoenzymatic profile.

80-0553. Paeschke, R. R.; Heitefuss, R. (Inst. Pflanzenpathol. & Pflanzenschutz, Univ. Goettingen, D-3400 Goettingen, BRD) **Der Einfluss von Herbiziden auf metabolisch aktive Bakterien und Pilze im Boden bei erstmaliger und mehrjaehriger Anwendung. [The influence of herbicides on metabolically active bacteria and fungi in soil after single or multiannual application.]** *Z. Pflanzenkr. Pflanzenschutz* 85(8-9): 471-481; 1978 (34 references) (German).

The effects of Aretite (dinoseb acetate), Aresin (monolinuron), and Gesatop (simazine) on soil microorganism respiration were examined in field experiments. Aretite inhibited CO_2 production by 40% after the first application to soil in the summer of 1974. Soil pretreated annually each spring with Aretite showed 17% inhibition of CO_2 production, while soil treated in autumn of 1974 showed inhibitions of 30% after the first application and 23% for each application thereafter. By the spring of 1975, inhibition of CO_2 production by soil fungi was 20% after the first Aretite application and 17% for repeated applications. Soil CO_2 production was depressed by 80% when application rates of Aretite were increased tenfold. Inhibitory effects of Aretite could be detected even up to 14 days after application. However, Aresin and Gesatop showed no inhibitory effects on CO_2 production in soil bacteria and fungi even at increased application rates. No permanent changes in the ratio of bacteria and fungi in the soil were noted after the herbicidal treatments.

See also 80-0302, 80-0303, 80-0304, 80-0307, 80-0308, 80-0309, 80-0314, 80-0316, 80-0317, 80-0319, 80-0320, 80-0321, 80-0322, 80-0332, 80-0356, 80-0373, 80-0395, 80-0399, 80-0403, 80-0406 *and* 80-0595.

80-0554. Abdel-Kader, M. H. K.; Peach, K. E.; Ragab, M. H. T.; Stiles, D. A. (Dep. Soil Sci., Univ. Manitoba, Winnipeg, Manitoba R3T 2N2, Canada) **The thin-layer chromatographic separation of halogentated fumigants as ammonium halides and their subsequent determination by MECA.** *Anal. Lett.* 12(A13): 1399-1410; 1979 (20 references).

The use of molecular emission cavity analysis (MECA) to determine several pesticides containing bromine and chlorine is described. Samples of ethylene chlorobromide, bromochloropropane, and a mixture of ethylene dibromide and ethylene dichloride were applied independently to the combustion paper of a Schoeniger flask, and after decomposition dissolved in aqueous ammonia. The ammonium halides were separated by TLC using microcrystalline cellulose adsorbent, then quantitated by MECA using either the InBr (λ_{max} = 376 nm) or the InCl (λ_{max} = 360 nm) emission bands. Recoveries were above 96. As a practical test of the method sandy loam soil fortified with various concentrations of 12-dibromo-3-chloropropane (DBCP) were extracted prior to combustion chromatography and MECA analysis. It was determined that shaking extraction gave a recovery of 92 compared to 85 from acid refluxing.

80-0555. Bruno, P.; Caselli, M.; Di Fano, A.; Traini, A. (Ist. Chim. Anal., The University, I-70126 Bari, Italy) **Fast and simple polarographic method for the determination of free and total sulfur dioxide in wines and other common beverages.** *Analyst* 104(1244): 1083-1087; 1979 (13 references).

A method for the determination of sulfur dioxide in wine that is based on the hydrolysis of acetaldehyde-α-hydroxysulfonate is presented. DMSO is used for the reduction of the sulfur dioxide and the pulse polarographic peak of sulfur dioxide is plotted against sulfuric acid concentration and pH. The currents are stable over a large range of pH values and are not affected by nitrogen bubbling. The method is useful for fast and simple measurements of bound and free sulfur dioxide in wines and other beverages such as orange or lemon juice. Compared to conventional titration methods, the present technique gives values slightly lower due to non-sulfur dioxide iodine-reducing substances in the wine which interfere in titrations.

80-0556. Miellet, A. (Lab. Agron., SICAGRO, F-45160 Olivet, France) **Analyses de residues de pesticides dans les sols et les vegetaux par chromatographic liquide a haute pression. [Analysis of residues of pesticides in soil and vegetation by high pressure liquid chromatography.]** *Ann. Falsif. Exper. Chim.* 72(778): 455-460; 1979 (8 references) (French).

The advantages of high pressure liquid chromatography (HPLC) for the analysis of pesticidal residues in agricultural products and in soil are discussed. HPLC often eliminates elaborate extraction and cleanup procedures while allowing for the simultaneous determination of many fungicides and insecticides. Also with HPLC, the sample is not destroyed during the analysis and may be recovered for further confirmatory analyses by other methods. The nature of the analyte, sample preparation, solvent quality, and detection limit are essential factors in the outcome of an HPLC determination.

80-0557. Getzin, L. W.; Satyanarayana, T. (Western Washington Res. & Ext. Cent., Washington State Univ., Puyallup, WA 98371) **Isolation of an enzyme from soil that degrades the organophosphorus insecticide, crotoxyphos.** *Arch. Environ. Contam. Toxicol.* 8(6): 661-672; 1979 (13 references).

An enzyme which catalyzed the hydrolysis of crotoxyphos ((E)-1- phenylethyl 3-[(dimethoxy phosphinyl) oxy]-2- butenoate) was isolated from nonsterile and radiation sterilized Chehalis clay loam with 1.5 *M* Tris (2-(hydroxy methyl)- 2-nitro- 1,3-propanediol) and partially purified with lead acetate treatment. Two soil-g equivalents of lead acetate purified enzyme in pH 8 buffer hydrolyzed 0.13 μmol of substrate to dimethyl phosphate and α-methylbenzyl 3-hydroxy crotonate in 16 hr at 37°C. The enzyme exhibited maximal activity around pH 8.0 and was irreversibly inactivated below pH 5.0 or above pH 10.0. The K_m value for crotoxyphos was calculated to be 4.63 x 10^{-3} *M*. The enzyme was stable at 60°C for 10 min, retained activity indefinitely at -10°C, and was completely inactivated within 1 wk at room temperature. When applied to autoclaved Chehalis clay loam, the purified enzyme lost 75% of its activity after 1 wk and the remainder within 2 wk. (Author abstract by permission)

80-0558. Wedzisz, A. (Dep. Food Sci., Inst. Environ. Res. & Bioanal., Acad. Med., Lodz, Poland) **Zastosowanie reakcji hamowania cholinesterazy *in vitro* do oznaczania niektorych pestycydow w badaniach dynamiki ich zanikania w uprawach roslin warzywnych. [Use of *in vitro* cholinesterase inhibition for the determination of some pesticides and their disappearance dynamics in vegetables.]** *Bromatol. Chem. Toksykol.* 12(1): 21-31; 1979 (9 references) (Polish).

A technique for measuring the *in vitro* inhibition of cholinesterase by plant protection agents and other compounds is described. Standard solutions were prepared, and 3 esters of thionophosphoric acid (after desulfurization), 2 carbamates, and 1 quaternary ammonium base were used as inhibitors on substrates of acetylcholine chloride, butyrylcholine, and propionylcholine. Results obtained by the method on trace amounts of inhibitors are compared to those obtained by more conventional gas chromatography procedures. The new method was also found to be satisfactory for the quantitation of inhibitors after their separation by thin-layer chromatography.

80-0559. Takaku, T.; Otsuki, A.; Takahashi, M. (Grad. Sch. Environ. Sci., Univ. Tsukuba Sakura-mura, Ibaraki, Japan) **[Simple and rapid determination of fenitrothion in water by reversed phase adsorption liquid chromatography.]** *Bunseki Kagaku (Anal. Chem.)* 28(11): 702-704; 1979 (4 references) (Japanese).

Reversed phase adsorption high pressure liquid chromatography by directly injected specimen was examined to develop a simple and rapid method for determining fenitrothion in water. A column filled with glass beads chemically bonded with diphenylsilane was found to be useful for the adsorption of fenitrothion in water. Fenitrothion was adsorbed from the specimen water directly injected onto the column and eluted as a sharp peak with a linear gradient elution from the water to 100% acetonitrile. The peak height detected at 280 nm (fenitrothion has an absorption maximum at around 270 nm) was proportional to the amount of fenitrothion injected in the range of from 0 to 800 ng. The recovery of fenitrothion from fortified distilled water and water in a pond at sub-ppb level was, respectively, 97.8 ± 0.25% and 95.6 ± 1.10%.

80-0560. Wislowska, E.; Kostowska, B. (Dep. Ecol. & Weed Prev., Inst. Agric., Fert., & Soil Sci., PL-50539 Warsaw, Poland) **Oznaczanie pozostalosci 1-fenylo- 4-amino- 5-chloro- 6-ketopirydaziny (chlorydazon) w glebie metoda chromatografii cienkowarstwowej. [Determination of 1-phenyl- 4-amino- 5-chloro- 6-ketopyridazine (chloridazon) residues in soil by thin-layer chromatography.]** *Chem. Anal. (Warsaw)* 24(4): 707-709; 1979 (4 references) (Polish).

A thin-layer chromatographic method for the determination of 1-phenyl- 4-amino- 5-chloro- 6-ketopyridazine (chloridazon, pyrazon) in soil is described. Following extraction from the mechanically cleaned soil sample with distilled methanol in a Soxhlet apparatus, the extract is evaporated to dryness in a rotary evaporator, after which the solid residue is dissolved in *n*-hexane and cleaned up on a silica gel-filled column, using distilled ethanol for elution. The thin-layer chromatographic determination is performed on an activated silica gel plate, using a mixture of potassium iodide, starch, and ethyl alcohol (1:5:1 v/v) as a solvent system. The Rf value is about 0.10. The recovery rate is 70-80%, but it can reach 90-95%, if plant materials are carefully removed from the soil sample prior to extraction. The detection limit is 0.02 ppm.

80-0561. Komives, T.; Marton, A. F.; Dutka, F. (Cent. Res. Inst., Hungarian Sci. Acad., Budapest, Hungary) **Organfoszfat peszticidmaradvanyok meghatarozasa szinezekanyagban gazdag elelmiszerekben. [Determination of residues of pesticides of organophosphate type in foods rich in pigments.]** *Elelmiszervizsgalati Kozl.* 24(4-5): 201-204; 1979 (7 references) (Hungarian).

A multiple method for the determination of organophosphorous pesticide (dimethoate, formothion, trichlorfon, mevinphos, chlorfenviphos, and phosphamidon) residues in pigment-rich foods is described. Extraction of the food samples with acetonitrile is followed by purification on a mixed column of kieselgel: activated carbon (3:1) using acetonitrile as the eluent. The pesticide content of the purified extract is determined by TLC, applying kieselgel as the sorbent, and a 24:1 mixture of chloroform:ethanol as the eluent.

80-0562. Fodor-Csorba, K.; Komives, T.; Marton, A. F.; Dutka, F. (Cent. Res. Inst., Hungarian Sci. Acad., Budapest, Hungary) **Tiokarbamat hericidek szermaradek meghatarozasa novenyi eredetu elelmiszerekban. [Determination of residues of thiocarbamate herbicides in foods of vegetable of origin.]** *Elelmiszervizsgalati Kozl.* 24(4-5): 205-209; 1979 (13 references) (Hungarian).

The color agents *N*-2,6- trichlorobenzo quinoneimine and *N*-chloro- 2,6- dibromobenzo quinoneimine were used for the detection and quantitative determination of EPTC and butylate residues in various frozen vegetable (green beans, peas, and potatoes) samples. The method proved suitable for the determination and recovery of the pesticides.

80-0563. Marton, A. F.; Komives, T.; Draskovics, I.; Dutka, F. (Cent. Res. Inst., Hungarian Sci. Acad., Budapest, Hungary) **Klorozott szenhidrogen peszticidmaradvanyok meghatarozasi eljarasanak izotopos ellenorzese II. [Control by isotopes of the methods for the determination of residues of pesticides of chlorinated hydrocarbon type II.]** *Elelmiszervizsgalati Kozl.* 24(5-6): 193-200; 1979 (19 references) (Hungarian).

Restrictions in the use of organochlorine pesticides have not proven effective since decreases in residue levels and degrees of food contamination have not been proportional to reduced availability. Methods which can measure residue levels reliably and routinely have become increasingly important, particularly in light of recent international attempts to further reduce acceptable residue levels. The procedures recommended in the Book of Methods, AOAC, based on the determination of ^{14}C-DDT and ^{14}C-DDE residue levels, have proved suitable for practical use in Hungary.

80-0564. Korolik, V. V. (N. I. Pirogov Moscow Med. Inst. 2, Moscow, USSR) **Izuchenie vliianiia bakterial'nykh insektitsidov na protsessy samoochishcheniia pochvy i vyzhivaemost' v pochve patogennykh enterobacteriy na primere *Salmonella typhimurium*. [Effects of bacterial insecticides on self purification of soil and survival in soil of pathogenic enterobacteria exemplified by *Salmonella***

typhimurium.] *Gig. Sanit.* 44(9): 78-80; 1979 (7 references) (Russian).

The effects of *Bacillus thuringiensis* on the self-purification of the soil and on the survival of *S. typhimurium* (input 10,000/g of soil), *Escherichia coli* (1,000,000/g), and *Clostridium perfringens* (10,000,000/g) were studied under laboratory and natural conditions. The *B. thuringiensis* dose was 60,000,000 viable spores per g of soil. *B. thuringiensis* persisted in the soil for 3 mo or longer. In soils containing considerable amounts of *B. thuringiensis, E. coli* and *S. typhimurium* had a considerably shorter survival time than in normal soil, while there was no significant change in the survival of *C. perfringens.* After the stabilization of the *B. thuringiensis* count in the soil, the self-purification of the soil was either similar to that of the control soil or a certain activation of the self-purification was seen compared with the controls.

80-0565. Kofman, I. Sh.; Kofanov, V. I. (Inst. Plant Physiol., Ukrainian SSR Acad. Sci., Kiev, USSR) **Gazokhromatograficheskiy analiz mikrokolichestv gerbitsidov gruppy tiokarbaminovoy kisloty v ob''ektakh okruzhaiushchey sredy. [Gas chromatographic analysis of traces of herbicides from the thiocarbamate group in environmental objects.]** *Gig. Sanit.* 44(10): 41-44; 1979 (7 references) (Russian).

A gas-chromatographic method for the determination of dithiocarbamate herbicides [eptam (EPTC), sutan (butylate), tillam (pebulate), vernam (vernolate), yalan (molinate), and ronit (cycloate)] in soil, water, and plant materials is described. The substances are extracted by distillation and collected in hexane. The hexane extract is evaporated, and the residue is dissolved in ethanol. A gas chromatograph with thermionic detector is used for the determination. The column filling is chromatone N-AWDMCS (0.16-0.20 mm) with 5% silicone DS-550. The sensitivity of the method is 0.02 mg/kg. The recovery rate is 85 ± 5%.

80-0566. Rienzi, R. (Lab. Anal., Bologna, Italy) **La spiralina cilindrica di platino spugnoso. [Platinum sponge cylindrical spiral.]** *Ind. Aliment. (Pinerolo, Italy)* 17(12): 951-954; 1978 (5 references) (Italian).

The platinum sponge cylindrical spiral, a highly sensitive component for use in gas chromatographic flame-ionization detection, is described. This component, combined with the flame-ionization detector, replaces the electron capture detector for the rapid estimation of trace amounts of pesticides in foods and beverages. Using this spiral, it is possible to detect parathion at a sensitivity of 100 pg.

80-0567. Ngoran, N.; Ercegovich, C. D.; Hickey, K. D.; Mumma, R. O.* (Pestic. Res. Lab. & Grad. Study Cent., Dep. Entomol., Pennsylvania State Univ., Univ. Park, PA 16802) **An improved analytical procedure for captafol residues in apple wood, leaves, and fruit.** *J. Agric. Food Chem.* 27(6): 1167-1170; 1979 (10 references).

The fungicide captafol is currently used for the control of various crop fungal diseases and has been introduced recently in apple pest management programs for control of scab on both leaf and fruit in a single application technique. We report an improved analytical technique for captafol residues in apple wood, leaves and fruits. The procedure involves extraction of plant tissue with acetonitrile, partitioning with a mixture of methylene chloride-petroleum ether, cleanup on Florisil column, and quantitation by gas-liquid chromatography, employing an electron-capture detector. Captafol residues as low as 4 ppb were determined. Average recoveries of captafol from fortified samples were 93.0, 97.1, and 87.1% for apple leaves, wood, and fruit, respectively. Samples from apple trees treated with captafol at 2 concentrations and at 2 locations were analyzed periodically to demonstrate the practical application of this method and to determine captafol distribution in the orchards. (Author abstract reprinted by permission of the American Chemical Society)

80-0568. Nelsen, T. R.; Cook, R. F. (Agric. Chem. Group, Res. & Dev. Dep., FMC Corp., Middleport, NY 14105) **A high pressure liquid chromatographic method for the determination of carbofuran residues in soil and water.** *J. Agric. Food Chem.* 27(6): 1186-1188; 1979 (8 references).

A method for residue analysis of carbofuran (2,3-dihydro- 2,2-dimethyl-7- benzofuranyl methylcarbamate) capable of quantitation of residues at the 0.10 ppm level in soil and water is presented. The method involves a methanol/water extraction, base hydrolysis of carbofuran to its phenolic moiety, and quantitation of the phenol which was accomplished by high-pressure liquid chromatography using a UV absorbance detector at 280 nm. Method recovery averaged 82.4 ± 8.3% for soil and 82.2 ± 9.6% for water. (Author abstract reprinted by permission of the American Chemical Society)

80-0569. Caro, J. H.; Freeman, H. P.; Bierl-Leonhardt, B. A. (Soil Nitrogen & Environ. Chem. Lab., Agric. Environ. Qual. Inst., Beltsville Agric. Res. Cent., USDA, Beltsville, MD 20705) **Determination of (*Z*)-9- tetradecan-1-ol formate, a *Heliothis* spp. mating disruptant, in air by electron-capture gas chromatography following photolytic cleanup.** *J. Agric. Food Chem.* 27(6): 1211-1215; 1979 (11 references).

A sensitive method for determination of (*Z*)-9-tetradecen-1-ol formate (*Z*-9-tdf) in air has been developed. The compound is trapped on a bed of Chromosorb 102, eluted from the bed with hexane, and reacted with bromine to form the *vic*-dibromide. The latter is subjected to 2

clean-up procedures - silica gel microcolumn chromatograhy, followed by thin-film ultraviolet light irradiation - and is then determined by electron-capture gas chromatograpy. Recovery through the method after correction for a consistent 40% loss of dibromide during UV cleanup is about 89%, and the quantitative limit in unpolluted air is less than 3 mg/m³. Identity of the *Z*-9-tdf-dibromide may be confirmed at levels of 40 ng/m³ and above by saponification and reaction with acetyl chloride to form the corresponding acetate. (Author abstract by permission of the American Chemical Society)

80-0570. Lakso, J. U.; Rose, L. J.; Peoples, S. A.; Shirachi, D. Y. (Sch. Pharm., Univ. Pacific, Stockton, CA 95211) **A colorimetric method for the determination of arsenite, arsenate monomethyl arsonic acid, and dimethyl arsinic acid in biological and environmental samples.** *J. Agric. Food Chem.* 27(6): 1229-1233; 1979 (28 references).

A spectrophotometric method is described for the determination of arsenite, arsenate, monomethylarsonic acid, and dimethylarsinic acid in biological and environmental samples. The arsenic species are volatilized to their corresponding arsines after reduction by sodium borohydride. The arsine and methylarsines form two different color complexes with silver diethyldithio carbamate. By use of simultaneous spectrophotometric equations, the amount of each arsine can be determined. The quantitative limit is 0.1 μg of elemental As for all 4 arsenic species. Recoveries of 90-100% of all 4 arsenic species from albumin, plant extracts, plasma, urine, and water are reported. (Author abstract reprinted by permission of the American Chemical Society)

80-0571. Aaron, J. J.; Kaleel, E. M.; Winefordner, J. D. (Dep. Chem., Univ. Florida, Gainesville, FL 32611) **Comparative study of low temperature and room temperature phosphorescence characteristics of several pesticides.** *J. Agric. Food Chem.* 27(6): 1233-1237; 1979 (43 references).

Room-temperature phosphorescence (RTP) and low-temperature phosphorescence (LTP) of 32 pesticides have been studied and compared. Low-temperature phosphorimetry has been shown to be a sensitive technique with the limits of detection ranging between 0.001 and 30 μ/ml according to the compound. The RTP method appears to be a very simple and specific technique of some pesticide standards with absolute limits of detection between 10 and 50 ng. (Author abstract reprinted by permission of the American Chemical Society)

80-0572. Yu, T. C.; Johnson, E. R.; Montgomery, M. L.* (Dep. Agric. Chem., Oregon State Univ., Corvallis, OR 97330) **Simultaneous extraction and analysis of trifluralin and nitrofen residues in crucifers.** *J. Agric. Food Chem.* 27(6): 1413-1414; 1979 (4 references).

A very sensitive analytical method has been developed for determination of trifluralin and nitrofen residues in kohlrabi, radish, rutabaga, and turnip. The method utilizes simultaneous extraction and purification of both herbicides and detection by electron-capture gas chromatography. Recoveries were greater than 90% at fortification levels of 10-40 ppb. (Author abstract reprinted by permission of the American Chemical Society)

80-0573. Goras, J. T. (Anal. Res. Dep., Pfizer Cent. Res., Pfizer Inc., Groton, CT 06340) **Modified method for carbadox in feeds: collaborative study.** *J. Assoc. Off. Anal. Chem.* 62(5): 982-984; 1979 (2 references).

The official first action method for carbadox in swine feed was modified in 2 respects. First, the samples were leached overnight at room temperature instead of boiled for 1 hr. This change avoided problems with overheating and excessive evaporation. Second, the dilution scheme for samples spiked with carbadox standard solution was changed to give absorbance values that were within the optimum working range of all types of spectrophotometers. The modified procedure was collaboratively studied by 21 laboratories. The repeatability standard deviation (σ_o) and reproducibility standard deviation (σ_r) were σ_o = 0.00029% and σ_r = 0.00056% (8.9% of grand mean) for feeds containing 0.000617% carbadox; and σ_o = 0.0012% and σ_r = 0.0019% (9.3% of grand mean) for feeds containing 0.0198% carbadox. The between-laboratory variance ratio was significant for feeds containing 0.0198% carbadox. The mean per cent of intent values for feeds containing 0.00617% carbadox and 0.0198% carbadox were 102% and 104%, respectively. In general, the statistical results were comparable to those previously obtained for the official first action method. Consequently, the modified procedure is not recommended as a replacement for the official first action method. (Author abstract by permission)

80-0574. Grant, R. G.; Pike, R. K. (Lab. Serv. Div., Agric. Canada, Ontario K1A OC5, Canada) **High pressure liquid chromatographic determination of chlorophacinone in formulations.** *J. Assoc. Off. Anal. Chem.* 62(5): 1001-1003; 1979 (5 references).

A simple and rapid method is described for determining 2-[(*p*- chlorophenyl] phenylacetyl)- 1,3-indandione (chlorophacinone) in rodenticides formulated as tracking powders and whole grain and crushed grain baits. The bait is extracted with methanol containing an internal standard, and the extract is injected into a high pressure liquid chromatograph. The sample is analyzed by reverse phase chromatography on octadecyl (G_{18}) bonded to glass beads with a mobile phase of methanol-water (35 + 65) plus

0.75% NH_4OH. A 5 μl injection containing 240 ng benzophenone internal standard and 77 ng chlorophacinone produces half scale peaks at 280 nm with a full scale absorbance of 0.01 absorbance unit. Two formulations and a spiked sample were analyzed by the method. Recovery as determined by peak area was > 97%. (Author abstract by permission)

80-0575. Hayes, E. H. (Off. Pestic. Programs, US EPA, Beltsville, MD 20705) **High pressure liquid chromatographic determination of pentachlorophenol by using paired ion chromatography reagents.** *J. Assoc. Off. Anal. Chem.* 62(5): 1004-1006; 1979.

A high pressure liquid chromatographic (HPLC) method for determining pentachlorophenol (PCP) in formulations is described. Samples containing pentachlorophenol are accurately weighed in suitable volumetric flasks and diluted with dioxane. The samples are then injected onto a stainless steel column containing μBondapak C_{18}. The mobile phase is 60% methanol/PIC A and 40% water/PIC A. This method is simple and eliminates many of the extractions required in other methods of analysis. (Author abstract by permission)

80-0576. Beljaars, P. R.; Rondags, T. M. M. (Food Insp. Serv., NL-6218 Mąastricht, The Netherlands) **High pressure liquid chromatographic determination of chloramine-T in food.** *J. Assoc. Off. Anal. Chem.* 62(5): 1087-1091; 1979 (5 references).

A high pressure liquid chromatographic (HPLC) method for determining chloramine-T (*N*-chloro-*N*-sodium- *p*-toluene sulfonamide) in foods such as ice cream, minced meat, and shrimp is described. Deproteinized samples are treated with sulfite to convert chloramine-T to *p*- toluenesulfonamide (*p*-TSA) and extracted, and HPLC analysis is performed on concentrated extracts. Sample extracts are chromatographed on a reverse phase 10 μm Lichrosorb RP-18 column with acetonitrile-water (10 + 90), and quantitated by an ultraviolet detector (220 nm) and digital integrator. The relationship between recorded peak area and concentration was linear to 0.600 μg *p*-TSA/μL. The detection limit was 2.5 mg *p*-TSA/μL, corresponding to a chloramine-T concentration of 0.8 mg/kg in samples. Recoveries of added chloramine-T were 88% for ice cream, 73% for minced meat, and 51% for shrimp. Precision data indicate a relative standard deviation of 1.54 and 2.14% for the complete analysis of ice cream with levels of 15 and 63 mg chloramine-T/kg (n = 5 determinations), respectively. The HPLC method was applied to chloramine-T determinations in 62 ice cream, 25 minced meat, and 25 shrimp samples. (Author abstract by permission)

80-0577. Luhning, C. W.; Harman, P. D.; Sills, J. B.; Dawson, V. K.; Allen, J. L. (Southeastern Fish Cont. Lab., Fish & Wildl. Serv., US Dep. Inter., Warm Springs, GA 31830) **Gas-liquid chromatographic determination of Bayer 73 in fish, aquatic invertebrates, mud, and Water.** *J. Assoc. Off. Anal. Chem.* 62(5): 1141-1145; 1979 (9 references).

A gas-liquid chromatographic (GLC) method is described for determining residues of Bayer 73 (clonitralid) (2-aminethanol salt of 2′,5- dichloro- 4′- nitrosalicyl anilide) in fish muscle, aquatic invertebrates, mud, and water by analyzing for 2-chloro- 4-nitroaniline (CNA), a hydrolysis product of Bayer 73. Bayer 73 residues are extracted from fish muscle tissue, invertebrates, and mud with acetone-formic acid (98 + 2), and partitioned from water samples with chloroform. After sample cleanup by solvent and acid-base partitioning, the concentrated extract is hydrolyzed with 2*N* NaOH and H_2O_2 for 10 min at 95°C. The CNA is then partitioned into hexane-ethyl ether (7 + 3) and determined by electron capture GLC. Average recoveries were 88% for fish, 82% for invertebrates, 82% for mud, and 98% for water at 3 or more fortification levels. (Author abstract by permission)

80-0578. Toyoda, M.; Ogawa, S.; Ito, Y.; Iwaida, M. (Osaka Branch, Natl. Inst. Hyg. Sci., Hoenzaka, Higashiku, Osaka, Japan) **Gas-liquid chromatographic determination of thiourea in citrus peels.** *J. Assoc. Off. Anal. Chem.* 62(5): 1146-1149; 1979 (3 references).

A gas-liquid chromatographic (GLC) method was developed for the detection and determination of thiourea in citrus peels. After the peel is extracted with ethyl ether, the ether extract is adsorbed on sodium sulfate together with water. Thiourea is recovered from both the sodium sulfate and the peel residue with ethyl acetate-acetone (2 + 1). The extracted mixture is cleaned on an alumina column, the eluate is concentrated under vacuum, and thiourea is extracted from the concentrate with sodium carbonate solution. GLC was carried out on the prepared recoveries of thiourea from lemon peel were 85.3, 93.1, and 97.6% at the fortification levels of 1, 10, and 100 ppm, respectively. The detection limit was as low as 0.08 ppm. (Author abstract by permission)

80-0579. Ahmad, N. (Biol. & Chem. Res. Inst., Rydalmere, New South Wales, Australia) **Cleanup of biological samples for detrermining *p,p′*-DDT and its metabolites.** *J. Assoc. Off. Anal. Chem.* 62(5): 1150-1154; 1979 (15 references).

A method is described for extracting tissue samples with hexane-acetone and hydrolyzing the fat and protein with aqueous sodium hydroxide. *p,p′*-DDT and its metabolites are measured on a gas chromatograph with an electron capture detector after cleanup on an alumina column. The new cleanup procedure gives 98% recoveries for *p,p′*-DDT and its metabolites added to fat *in vitro*, compared with 84% recovery by a modified commonly used

method. Comparison by Student's *t*-test of the new method with the modified method on 32 cattle biopsy, 46 bird, and 20 fish samples for *in vivo* incurred *p,p'*-DDT residues showed that the results by the new method were significantly higher at the 95% confidence level. Alkali-hydrolyzed extract did not contaminate the detector. The new procedure avoids the use of dimethylformamide and shortens the time of analyses. A correlation (r=0.68) was observed between the fat-soluble protein concentration of the *n*-hexane extract and the *p,p'*-DDT residues. (Author abstract by permission)

80-0580. Greve, P. A.; Grevenstuk, W. B. F. (Unit Residue Anal., Natl. Inst. Public Health, Bilthoven, The Netherlands) **Gas-liquid chromatographic determination of bromide ion in lettuce: interlaboratory studies.** *J. Assoc. Off. Anal. Chem.* 62(5): 1155-1159; 1979 (6 references).

The gas-liquid chromatographic method for the determination of bromide ion (a degradation product of the pesticide methyl bromide), as originally described for grain by Heuser and Scudamore, was adapted for use on lettuce, and later on products of other vegetable or of animal origin. After optimization of the ashing and derivatization conditions, 2 interlaboratory studies were carried out in The Netherlands. In the first, a preparatory study, 6 laboratories investigated freeze-dried lettuce; in the second definitive study, 8 laboratories investigated both freeze-dried and fresh lettuce. Four lots of lettuce with bromide contents ranging from about 5 to about 200 mg/kg were investigated. Average bromide contents as mg/kg and between-laboratory coefficients of variation were 5.6 (11.0%), 13.3 (18.4%), 29.9 (8.3%), and 209 (12.8%). The results obtained are normal for the type of work and the conditions of the study. The method will be recommended for regulatory use in The Netherlands and in international organizations. (Author abstract by permission)

80-0581. Babjak, L. J.; Chau, A. S. Y. (Water Qual. Branch, Canada Cent. Inland Waters, Burlington, Ontario L7R 4A6, Canada) **Evaluation of 14 charcoal-polyurethane foam mixtures for the separation of mirex and photomirex from Aroclor 1254.** *J. Assoc. Off. Anal. Chem.* 62(5): 1174-1176; 1979 (7 references).

The efficiency of 14 different types of charcoals mixed with polyurethane foam (40% charcoal/60% foam, w/v) for the separation of photomirex and mirex from Aroclor 1254 was investigated. Photomirex and mirex were eluted with 10 ml cyclohexane from minicolumns containing 0.2 g charcoal-foam mixture. An additional elution with 10 ml benzene yielded Aroclor 1254. Average recovery using Norit C-170 charcoal-foam mixture was 99.1% for photomirex at the 1.0 ug level, 100.1% for mirex at the 1.0 ug level, and 96.8% for Aroclor 1254 at the 3.0 ug level. For the other 13 charcoals investigated, recoveries from duplicate analyses were 47.0-115.5% for photomirex, 71.9-106.1% for mirex, and 23.3-114.6% for Aroclor 1254. (Author abstract by permission)

80-0582. Kulshrestha, G. (Div. Agron., Indian Agric. Res. Inst., New Delhi 110012, India) **Single step extraction and cleanup for determination of diuron in soil.** *J. Assoc. Off. Anal. Chem.* 62(5): 1191-1192; 1979 (4 references).

A simplified method has been developed for the extraction and cleanup of diuron [3- (3,4- dichlorophenyl)-1,1-dimethyl urea, or Karmex] residues from soil. Soil mixed with Florisil and anhydrous sodium sulfate is eluted with acetone and determined spectrophotometrically. No further cleanup is necessary. Recoveries of diuron from alluvial, black, red, and calcareous soils were >90%. (Author abstract by permission)

80-0583. Helfant, L. J. (Amchem. Prod. Inc., Ambler, PA 19002) **Gas-liquid chromatographic determination of bromoxynil octanoate: collaborative study.** *J. Assoc. Off. Anal. Chem.* 62(6): 1215-1219; 1979 (4 references).

The assay of bromoxynil octanoate by a gas liquid chromatographic (GLC) procedure with di-*n*-butylphthalate as the internal standard was previously subjected to collaboration. The method had a standard deviation of 0.6% but results varied according to the complexity of the formulation being tested. To reduce the systematic errors of the method, the internal standard was changed to *n*-docosane. The change in elution time of the marker simplified the chromatogram and reduced the standard deviation of the study to 0.3%. The revised method has been adopted as official first action for determining bromoxynil octanoate. (Author abstract by permission)

80-0584. Cohen, C. J. (Agric. Chem. Corp., Mobay Chem. Corp., Kanasas City, MO 64120) **Infrared spectrophotometric method for analysis of Guthion insecticide: collaborative study.** *J. Assoc. Off. Anal. Chem.* 62(6): 1220-1221; 1979.

A collaborative study on the assay of Guthion (azinphos methyl) has been conducted by 10 laboratories. Data were obtained on a 4.4 kg/3.785*l* liquid concentrate and a 50% wettable powder formulation. The procedure specifies extraction and/or dilution followed by infrared absorbance measurement at 654/cm. The method has been adopted as official first action. (Author abstract by permission)

80-0585. Cochrane, W. P.; Lanouette, M.; Greenhalgh, R. (Lab. Services Div., Agric. Canada, Ottawa, Ontario K1A OC5, Canada) **Quantitation of the contaminants in**

technical fenitrothion by reverse phase high pressure liquid chromatography. *J. Assoc. Off. Anal. Chem.* 62(6): 1222-1230; 1979 (10 references).

Technical grade samples of fenitrothion were analyzed by high pressure liquid chromatography (HPLC) on a reverse phase LiChrosorb RP-8 column, using 3 solvent systems and a UV detector set at 269 nm. All commercial samples analyzed contained >94% fenitrothion; in addition, 9 contaminants were identified and quantitated. Bis-fenitrothion was the major contaminant, with average amounts of 2.46% from one manufacturer and 1.17% from another. The second most abundant toxicant was *S*-methyl fenitrothion, which was present at an average level of 0.71% in one source but only 0.16% in the other. The amount of fenitrooxon was 0.046% or less in samples from 2 manufacturers. Other contaminants quantitated include the 2 demethyl fenitrothion isomers, 3-methyl- 4-nitrophenol, 3-methyl- 6-nitrophenol, 3-methyl- 4-nitroanisole, and bis-*S*- methyl fenitrothion. The total amount of the constituents quantitated in 9 commercial samples was 99.07 ± 1.81%. By comparing the amounts of bis-fenitrothion and phenols present in technical grade fenitrothion, it should be possible to identify the specific manufacturers of the various products. (Author abstract by permission)

80-0586. Koubek, K. G.; Ussary, J. P.; Haulsee, R. E. (Agric. Chem. Div., ICI Americas Inc., Goldsboro, NC 27530) **High pressure liquid chromatographic determination of the rodenticide brodifacoum in rat tissue.** *J. Assoc. Off. Anal. Chem.* 62(6): 1297-1301; 1979 (7 references).

An HPLC method was developed to determine residues of individual isomers of brodifacoum (3-[3-4'-bromo [1,1'-biphenyl]- 4-yl)- 1,2,3,4- tetrahydro- 1-naphthalenyl]- 4-hydroxy- 2*H*- 1-benzopyran- 2-one) in rat tissue. The compound was extracted twice with 10% methanol in chloroform, filtered, and cleaned up by using automated gel permeation chromatography. A final cleanup on a silica gel SEP-PAK was added to protect the analytical column from irreversible adsorption and to reduce analysis time. The analysis was done on a μ Porasil column; a UV detector was used for quantitation. Recoveries of brodifacoum added to rat tissue in concentration of 0.12-5.0 ppm were greater than 90%. (Author abstract by permission)

80-0587. Chau, A. S. Y.; Thomson, R. (Water Qual. Branch, Canada Cent. Inland Waters, Environ. Canada, Burlington, Ontario L7R 4A6, Canada) **Analytical reference materials. I. Preparation and purification of photomirex.** *J. Assoc. Off. Anal. Chem.* 62(6): 1302-1308; 1979 (13 references).

The preparation and purification of photomirex (1,2,3,4,5,5, 6,7,9,10,10- undecachloro pentacyclo [5.3.0.0^{2,6} .0^{3,9}.0^{4,8}] decane] as an analytical reference standard is detailed. A previous synthetic procedure was modified and improved to reduce hazards and to increase yield. Briefly, mirex is reduced by triphenylphosphine in the presence of propionic acid, and purified by alumina column chromatography to obtain 60-70% yield of the desired compound. (Author abstract by permission)

80-0588. Oehler, D. D. (Vet. Toxicol. & Entomol. Res. Lab., Sci. & Educ. Adm., ARS, USDA, College Station, TX 77840) **Gas-liquid chromatographic determination of permethrin in bovine tissues.** *J. Assoc. Off. Anal. Chem.* 62(6): 1309-1311; 1979 (3 references).

A method is presented for the determination of permethrin (*m*-phenoxybenzyl *cis,trans* - (±)- 3-(2,2-dichlorovinyl)- 2,2-dimethylcyclopropane carboxylate) in bovine tissues. Fat and muscle samples were cleaned up first by liquid-liquid partition on a bonded phase chromatographic column. Final cleanup of fat and muscle was performed on a short Florisil column. Liver, kidney, spleen, and heart tissues only required cleanup on a Florisil column before quantitation of permethrin by electron capture gas-liquid chromatography. (Author abstract by permission)

80-0589. Chau, A. S. Y.; Carron, J.; Lee, H. B. (Water Qual. Branch, Canada Cent. Inland Waters, Environ. Canada, Burlington, Ontario L7R 4A6, Canada) **Analytical reference materials. II. Preparation and sample integrity of homogeneous fortified wet sediment for polychlorinated biphenyl quality control studies.** *J. Assoc. Off. Anal. Chem.* 62(6): 1312-1314; 1979 (7 references).

A simple method for the preparation of a large quantity of homogeneous wet sediment containing DDT and DDE and spiked with polychlorinated biphenyls (PCBs) is presented. By using a large blender and adding water to form a thick slurry, more than 2 kg spiked wet sediment was homogenized and 100-200 subsamples of 10-15 g, each suitable for checking precission and accuracy of a method or a laboratory, could be obtained. Eighteen Lake Ontario sediment subsamples were analyzed to check homogeneity. The mean recovery was 97.9% for a 1:1 mixture of Aroclors 1254 and 1260 fortified at 1 ppm; the coefficient of variation was 5.4%. For the Georgian Bay sediment, recovery for 5 replicates was 97.8% with a coefficient of variation of 3.2% for the same Aroclor mixture fortified at 0.629 ppm. Subsamples stored at -20°C for up to 3 mo showed no losses of PCBs for these 2 sediments. Stability data also provided additional support for the homogeneity of the subsamples for these 2 sediments. The presence of *p,p'*-DDE did not interfere with PCB quantitation. (Author abstract by permission)

80-0590. LeBel, G. L.; Williams, D. T. (Monit. & Criteria Div., Environ. Health Cent., Health Prot. Branch,

Health & Welfare Canada, Ottawa, Ontario K1A 0L2, Canada) **Effect of injection solvent on gas chromatographic quantitation of some polar organophosphorus pesticides.** *J. Assoc. Off. Anal. Chem.* 62(6): 1353-1355; 1979 (2 references).

Hexane solution aliquots containing 4 ng dimethoate and 8 ng β-phosphamidon gave peak heights on gas chromatographic analysis only 64% and 43%, respectively, of those from corresponding aliquots of acetone solutions. The low values with hexane solutions were caused by adsorption of these compounds in the syringe. Acetone solutions of these compounds showed no losses due to syringe adsorption. (Author abstract by permission)

80-0591. Leclercq, P. A.; Pacakova, V. (Lab. Instrum. Anal., Eindhoven Univ. Technol., NL-5600 MB Eindhoven, The Netherlands) **Gas chromatography and mass spectrometry of bis(alkylamino)-*s*-triazines.** *J. Chromatogr.* 178(1): 193-207; 1979 (31 references).

The retention behavior of 22 2-chloro, 2-methoxy- and 2-methylthio- 4,6-bis(alkylamino) triazines was studied on 4 gas chromatographic columns with different polarities. The most polar stationary phase, Carbowax 20M, was found to be the best suited for the separation of these compounds. The differences in the retention indices of the same triazines on columns with different polarities were found to be proportional to the pK_a values and the dipole moments of these compounds. Electron-impact mass spectra and deduced fragmentation schemes are given. The stability of the compounds under electron impact increases in the order chloro < methoxy < methylthio derivatives. Chemical-ionization mass spectra, using methane as reagent gas, are tabulated. It has been found that the ease of fragmentation of the protonated molecular ions of chlorotriazines is related to the low proton affinity of the leaving neutral HCl group. In the isobutane chemical-ionization mass spectra all triazines exhibited the protonated molecular ion as the base peak with only relatively minor fragmentations. (Author abstract by permission)

80-0592. Zietek, M. (Inst. Toxikol. & Forensische Chem., Med. Akad. Krakow, PL-30084 Krakow, Poland) **Ueber die polarographische Bestimmung von Hydrolyseprodukten von phosphoroganischer Pesticide im Urin. [Polarographic determination of hydrolysis products of organophosphorus pesticides in urine.]** *Mikrochim. Acta* 2(1-2): 75-83; 1979 (15 references) (German).

A polarographic procedure for the detection of the nitrophenol metabolites of some organophosphorus pesticides in rat urine is described. Wistar rats were given parathion, methyl parathion, EPN, folithion (fenitrothion), chlorthion, or dicapthon, and urine was periodically sampled from the poisoned animals. The method afforded the polarographic detection of all of the pesticides tested without the use of an extraction procedure.

80-0593. Carroll, M. K.; Bourg, J. A. (New Orleans Mosq. Control, New Orleans, LA 70126) **Methods of ULV droplet sampling and analysis: effects on the size and spectrum of the droplets collected.** *Mosq. News* 39(3): 645-655; 1979 (24 references).

Five different methods of sampling ultra low volume (ULV) malathion droplets were assessed. All droplets were collected at a distance of 7.6 m from the nozzle by the parallel hand wave, slide pendulum, mechanical slide rotator, and large and small settling chamber methods. The small chamber and Teflon coated mechanical slide rotator proved to be best suited for field collection of droplets from ULV generators. Due to lower droplet velocities and environmental effects, collection of malathion droplets 1.2 m from the nozzle may be more representative of the actual droplet spectrum than collection from the 7.6 m distance.

80-0594. Anonymous **Schnelle Auffindung von Umweltgiften. [Rapid detection of environmental toxins.]** *Naturwiss. Rundsch.* 32(10): 419; 1979 (German).

A simple and rapid bioassay method for the detection of very small amounts of highly toxic environmental chemicals has been developed. Environmental samples containing the toxic substances at concentrations as low as 1 pg can be added directly to the mammalian cells. The reaction of the cells to the toxic substance is measured. The new method is especially suitable for routine and random examinations of soil samples from the vicinity of chemical plants suspected of emitting toxic substances. TCDD detection in Seveso soil is used as an example. The accuracy of the new method is comparable to that of the conventional physical and chemical methods.

80-0595. Cooke, B. K.; Loeffler, R. S. T.; Pappas, A. C. (Long Ashton Res. Stn., Univ. Bristol, Bristol BS18 9AF, England) **The structural rearrangement of iprodione in ethanolic solution.** *Pestic. Sci.* 10(5): 393-398; 1979 (6 references).

Iprodione, in ethanolic solution, was found to undergo structural rearrangement over a period of days to give a solid product which was shown by mass spectrometry to be an isomer. Mechanistic considerations led to a proposed structure, which was verified by synthesis of an authentic specimen by an unambiguous route. The biological implications of these findings are discussed. (Author abstract by permission)

80-0596. Rao, D. M. (Dep. Zool., Nagajuna Univ., Nagarjuna Nagar 522510, India) **Contamination of endosulfan formulations with DDT.** *Pesticides* 12(9): 34-35; 1978 (3 references).

Studies performed to determine soil persistence and leaching of thiodan (R) (endosulfan) indicated that DDT was a contaminant of the thiodan formulation. The pesticide formulation was a mixture of two isomers, A and B. The two isomers plus the degradation products endosulfan alcohol and endosulfan ether were observed on thin layer chromatography plates, along with spots having the same R_f as DDT. Four other endosulfan products on the market were analyzed and were found to be contaminated with considerable quantities of DDT.

80-0597. Kamimura, H.; Nishijima, M.; Nagayama, T.; Saito, K.; Yasuda, K.; Ibe, A.; Ushiyama, H.; Naoi, Y. (Tokyo Metrop. Res. Lab. Public Health, Shinjuku-ku, Tokyo, Japan) **[Analytical procedure for methyl bromide residues in agricultural products.]** *Shokuhin Eiseigaku Zasshi (J. Food Hyg. Soc. Jpn.)* 20(4): 257-261; 1979 (8 references) (Japanese).

Investigation of the analytical procedures for determining methyl bromide residues in wheat, unpolished rice, cherry, chestnut, and plum was carried out and the following method was developed. The specimen was homogenized under cooling with cooled ethanol. The homogenate was evaporated at 50°C under an air current of 80 ml/min (bubbling into the homogenate) for 120 min. The evaporated substance was collected at -70°C and subjected to gas chromatography using 20% Ucon oil 50 LB 550X. Recovery of methyl bromide was 89-98% with a detection threshold of 0.05 ppm. Any interference with detection was not found on the specimen. The above technique is proposed to be a standard method of determining methyl bromide residues in agricultural products.

80-0598. Barthelemy, J. P.; Copin, A.; Deleu, R.; Closset, J. L. (Chaire Chim. Anal., Fac. Sci. Agron., B-5800 Gembloux, Belgium) **Application de la spectrometrie par reflexion totale attenuee multiple dans l'infrarouge a l'identification de residus de plusieurs herbicides urees dans des eaux naturelles. [Use of multiple attenuated total reflection infrared spectrometry for identifying residues of several urea herbicides in natural waters.]** *Talanta* 26(9): 885-888; 1979 (18 references) (French).

Eleven substituted ureas used as herbicides were studied (buturon, chlorbromuron, chlortoluron, diuron, fenuron, isoproturon, linuron, monuron, metabenzthiazuron, metoxuron, neburon). After separation by thin-layer chromatography infrared microtechniques (multi attenuated total reflexion) were used to identify the herbicide residues. The R_f values obtained in the thin layer chromatographic separation of the 11 herbicides were related to the X_2 of their chemical structure. A list of the absorption bands used in differentiating the 11 substituted ureas is given. The detection limit is 40 ppm (40 μg/l) in the most favorable cases. Interferences from extracts of natural waters and the limitations of the method are also considered.

80-0599. Chmil', V. D.; Brezhneva, M. K. (Author address not given) **Opredelenie γ-izomera geksakhlor tsiklogeksana i geksakhlor *p*- ksilola v moloke i slivochnom masle pri sovmestnom prisutstvii. [Stimultaneous determination of lindane and hexachloro *p*-xylene in milk and butter.]** *Vopr. Pitan.* (5): 64-66; 1979 (5 references) (Russian).

A gas-chromatographic method for the simultaneous determination of lindane and hexachloro *p*-xylene (HCPX) in milk and butter is described. A gas chromatograph with a differential electron capture detector was used for the determination. The extraction and clean-up were carried out according to standard procedures. The stationary phase used was phenylmethyl silicone OV-17, which ensured the differentiation of the 2 substances: under these conditions the retention time of lindane was 46.7 sec, that of HCPX 33.4 sec. The recovery rates from milk were 84.2% for HCPX and 89.6% for lindane; the recovery rates from butter were 78.2% for HCPX and 83.1% for lindane. The sensitivity of the determination of HCPX in butter is 0.05 mg/kg, in milk 0.01 mg/kg.

80-0600. Abdullaev, S.; Karimov, R. K.; Aripov, Kh. N.; Shakirov, T. T. (Inst. Chem. Plant Compounds, Tashkent, USSR) **Opredelenie deistvuiushchego veshchestva v gerbitside toluine metodom gazozhidkostnoi khromatografii. [Determination of the active ingredient in the herbicide toluine by gas-chromatography.]** *Zh. Anal. Khim.* 34(7): 1421-1423; 1979 (6 references) (Russian).

A gas-liquid chromatographic determination of the active ingredient of the herbicide toluine (*N*- methoxyethylchloro aceto-*o*- toluidide) in technical toluine and in a 30% wettable powder is described. The detectability of pure toluine and dibutylphthalate, used as the internal standard, in artificial mixtures was 98.4% and 98.8%, respectively. Detection of the active ingredient in a 30% wp formulation was 31.0%.

See also 80-0309, 80-0313, 80-0318, 80-0326, 80-0336, 80-0340, 80-0352, 80-0355, 80-0357 *and* 80-0411.

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